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UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME 23, PART 2

TREES AND SHRUBS OF MEXICO

(FAGACEAE–FABACEAE)

By PAUL C. STANDLEY

WASHINGTON
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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM.

II

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PREFACE.

The present part of volume 23 of the Contributions is a second installment of the Trees and Shrubs of Mexico, by Mr. Paul C. Standley, assistant curator of the United States National Herbarium. This portion of the work extends from the oak family to the bean family, both inclusive. Some of the largest and most important groups of Mexican plants are included in the families here treated, which contain many species of economic value. The account of the oaks has been prepared by Dr. William Trelease, of the University of Illinois.

FREDERICK V. COVILLE,
Curator of the United States National Herbarium.

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TREES AND SHRUBS OF MEXICO.[1]

By Paul C. Standley.

22. FAGACEAE. Beech Family.

The only representatives of this group native in Mexico are the oaks, which belong to the largest genus of the family. The Old World chestnut ("castaño," the tree; "castaña," the nut), *Castanea sativa* Mill., is said to be cultivated occasionally in Mexico, Oaxaca, and other states.

1. QUERCUS L. Sp. Pl. 994. 1753.

(Contributed by Dr. William Trelease.)

Reference: A. De Candolle in DC. Prodr. 16[2]: 2–109. 1864.

Trees or shrubs; leaves alternate, deciduous or persistent, entire, toothed, or lobed, the teeth and lobes often bristle-tipped; flowers monoecious, the staminate ones in slender catkins; stamens 6 to 12; pistillate flowers solitary or in small clusters; ovules 6, but only one maturing; fruit an acorn, subtended by an enlarged cup (involucre).

The genus *Quercus* is very abundantly represented in Mexico; indeed, no other country has so large a number of species. In this region the oaks are found chiefly in the mountains. In northern Mexico the species grow at comparatively low altitudes, in the arid mountains, but they occur also at high altitudes in the larger ranges, such as the Sierra Madre. In southern Mexico oaks are almost confined to the high mountains, but a few species occur near sea level.

From an economic standpoint oaks are very important. The wood is of the highest quality, being very strong and durable, although these characters vary in different species. It is used for an infinite variety of purposes, especially where strength is desirable. It is highly valued for furniture and for the interior finish of buildings, for ship building, wagons, railroad ties, and many other purposes. As fuel, also, it is unsurpassed. No other group of hardwood trees furnishes wood which is so widely used, in Mexico as well as elsewhere. The bark, too, is important economically, being one of the most widely used tanbarks. Several species of southern Europe have very thick, corky bark, which furnishes the cork of commerce.

The leaves of oak trees are often punctured by insects, and as a result galls ("manzanitas de encina") are formed. These are frequently of the most beautiful and bizarre forms, and often brilliantly colored. They sometimes contain as much as 60 or 70 per cent of tannic acid, and consequently they are excellent for use in tanning leather. They are widely employed also for making ink.

Oaks are almost unsurpassed as shade trees in temperate regions. Because of their tough wood they are seldom broken by wind. Their broad tops give them a handsome appearance, and they are very long-lived.

The acorns ("bellotas"), too, are of considerable economic importance, although less so now than formerly.[3] In early times they were an important

[1] The first installment of the Trees and Shrubs of Mexico, comprising the families Gleicheniaceae to Betulaceae, was published as Part 1 of Volume 23, Contributions from the U. S. National Herbarium, pp. 1–170, October 11, 1920.

[2] See V. Havard, Bull. Torrey Club 22: 118–119. 1895.

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food of the American Indians, especially those of California and certain parts of Mexico, and they are still employed to some extent. Acorns contain starch, fixed oil, citric acid, sugar, and astringent and bitter principles. Sometimes they are sweet enough to be eaten raw without preparation, but usually it is necessary to rid them of the bitter principle. This is done by shelling and skinning the seeds, then pounding them into meal. The meal is washed repeatedly in water and then boiled as a mush or baked as cake or bread. White oaks (subgenus *Leucobalanus*) have the sweetest and most palatable acorns and have been the most generally used. All the live oaks (such as *Quercus virginiana*, *Q. pungens*, and *Q. oblongifolia*) are said to have edible acorns, but the black oaks (subgenus *Erythrobalanus*) were not extensively employed. The Indians of the southeastern United States obtained from the acorns of *Q. virginiana* a sweet oil much used in cooking. In more recent times acorns have often been roasted and employed as a substitute for coffee, or as an adulterant of it.

Oaks are of little importance in medicine. In Mexico the staminate catkins are reputed anodine and antispasmodic, being used as remedies for vertigo and epilepsy. The bark and acorns are sometimes used as astringents.

One of the most interesting products of these trees is the lac, widely known in Mexico, which is produced by certain scale insects, or Coccidae. This, presumably, is produced on various species of oaks, and also upon trees and shrubs of other families. The following account, by Urbina,[1] of its production upon *Quercus reticulata*, may be quoted here:

"It seems worth while to mention here the manna which forms on *Quercus acuminata* H. B., an oak which grows at Medina, on the boundary between the States of Michoacán and Mexico, which was studied by Sr. D. Melchor Ocampo, who gave the tree the name of *Quercus mellifera*, its vernacular name being *encina de miel*. According to Dr. Oliva (Lecc. Farm. 2: 84), in May it produces an abundance of a globular rough substance, which turns black and resembles manna. Sr. Dr. D. Manuel M. Villada brought back from an excursion which he made to Medina a branch of this tree, black as if the bark were covered with rubber, due to a fungus which had formed in such quantity that it gave rise to a thick layer, in whose midst appeared very fine threads, long and transparent, like caramel, and which, in my opinion, are produced by a *Coccus* or aphis which feeds on this sugary substance. The excess is emitted in threads whose peculiar form is due to the abdominal tubes of the aphis. The explanation of this seems to me to be the following: In the month of May there is an abundant secretion of glucose produced by the bark of the oak, which is taken advantage of not only by the aphis which make these caramel-like threads, but also by the fungus which attacks the bark.

"Under the circumstances, I believe it desirable that a study be made of this product, which, in the opinion of Sr. Oliva, may be a manna, a presumption apparently justified by the existence of two organisms; the fungus and the *Coccus*, which develop simultaneously, using the same food—the glucose. And as this principle is the dominant one in manna, I believe with Sr. Oliva that this oak under favorable conditions produces this substance, which should be analyzed carefully, after visiting the place where the oak grows, and studying the manner of its formation, in order to comfirm or correct this view."

The vernacular names applied to the species of oaks can be given in only a few instances. Many names are found in literature, but the species have been so confused that no confidence can be placed in the determinations. The usual Spanish names are "encina" (live oak) and "roble" (deciduous oak),

[1] Naturaleza 7: 105–106. 1900.

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with various modifying adjectives. The following names also are reported for species not identified: "Alcornoque" (Oaxaca, Michoacán; this is properly the name for the Spanish cork oak); "cucharitas," "peinecillo" (Oaxaca, *Reko*); "encina memelita"; "charrasquillo" (Durange, *Patoni;* shrubby species); "encinilla" (Durango, *Patoni;* shrub, 40 cm. high or less).

The usual Nahuatl word for oak is written "ahuatl," "ahoatl," and "aoatl"; the following variants are reported: "Ahoaquahuitl," "ahuaquahuitl," or "auaquauitl" (oak-tree); "ahuatetz," "auatetz," "ahuatetzmolli," "auatetzmulli" (live oak); "ahuacoztic" (yellow-oak); "ahuatzin pitzahuac" (narrow-leaf oak); "texmole" (Michoacán); "ahuatezon" (Morelos, Mexico); "ahuatomatl" (acorn, literally "oak-tomato"; sometimes corrupted as "aguatomate") Geographic names relating to oak trees are: Ahuatepec, "oak-hill"; Ahuachichilpa, "in the red oaks"; Ahuatlán, "near the oaks."

Reko gives the following Zapotec names used in Oaxaca: "Yaga-yoo," "yaga-reche," "yaga-xoo," "yaga-cino," "yaga-zache." Belmar lists the following Mixe names: "Kook" (acorn); "sho"; "shokiup"; "shotiönit" (acorn). Otomí names, according to Buelna, are "mêttsa" and "ndezâ" (acorn). González gives the Zoque name as "camay-cuy." A name reported by Ramírez from Michoacán, probably Tarascan, is "tarecuen."

I. Fruit (not known in nos. 6, 7, 11, 15, 21, 26, 28, 34, 39) maturing the first season; shell of acorn not woolly within, the abortive ovules at or near its base; stigmas short and broad, nearly sessile; leaves not aristate, but sometimes with tip and teeth pungently mucronate. LEUCOBALANUS.

A. Leaves, or many of them, serrate, never very small.

B. Acorn (so far as known) large or very large (20 to 70 mm. in diameter). Leaves large.

Acorn depressed-globose ..... 1. Q. insignis.

Acorn short-conical ..... 2. Q. strombocarpa.

Acorn elongate. Teeth of leaf mostly larger.

Acorn very large (40 mm. broad and 60 mm. long). Scales short, in rings ..... 3. Q. cyclobalanoides.

Acorn distinctly smaller (30 mm. broad and 50 mm. long). 4. Q. excelsa.

Acorn ovoid ..... 5. Q. galeottii.

Acorn unknown. Leaves rather blunt-toothed.

Leaves distinctly short-petioled ..... 6. Q. pinalensis.

Leaves nearly sessile ..... 7. Q. chinantlensis.

Leaves moderate (scarcely 3 cm. wide and 10 cm. long), sharply serrate. 8. Q. leiophylla.

BB. Acorn unknown. Leaves polymorphous on the same twig. 41. Q. diversifolia.

BBB. Acorn moderate (scarcely 15 mm. in diameter). Leaves moderate, nearly all toothed.

Leaves finely venulose-reticulate on both faces ..... 9. Q. lancifolia.

Leaves heavily reticulate beneath, rugulose above. 10. Q. glabrescens.

AA. Leaves, or many of them, crenate or shallowly round-lobed, never very small. Fruit never very large.

Leaves blue-green, glabrous, somewhat glaucous, coriaceous, not rugose.

Leaves elliptic or oblong, low-crenate ..... 11. Q. glaucoides.

Leaves obovate, more deeply crenate ..... 12. Q. glaucophylla.

Leaves green, or else rugose or not coriaceous.

C. Leaves glabrate or somewhat thinly puberulent.

D. Leaves oblanceolate-ovate. Fruit unkown ..... 15. Q. nudinervis.

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DD. Leaves elliptic-obovate or obovate.
Leaves subacute, scarcely rugose.....14. Q. idonea.
Leaves very obtuse.
Leaves somewhat rugose and puberulent.....38. Q. arizonica.
Leaves not rugose, glabrate.
Leaves finely low-venulose beneath.....15. Q. nudinervis.
Leaves heavily veiny beneath.....16. Q. standleyi.
DDD. Leaves elliptic-oblong, characteristically crenate only above.
Fruit subsessile; acorn exserted.....19. Q. sororia.
Fruit stout-peduncled; acorn nearly included.....20. Q. germana.
DDDD. Leaves oblanceolate. Cup scales thickened.
13. Q. tuberculata.
Acorn oblong, rather slender (10 to 15 mm. in diameter, 15 to 25 mm. long.)
Leaves slender-petioled, round-based.....17. Q. polymorpha.
Leaves short-petioled, subcuneate at base.....18. Q. juergensenii.
Acorn round-ovoid, thicker.....19. Q. sororia.
CC. Leaves transiently silvery beneath, elliptic-oblong or obovate.
52. Q. breviloba.
CCC. Leaves pale-tomentulose beneath, broadly oblanceolate.
21. Q. glaucescens.
CCCC. Leaves dingy-puberulent or tomentulose beneath. Peduncle moderate or rather long.
Leaves not extremely large, distinctly or slenderly petioled.
Leaves scarcely more than undulate.....30. Q. peduncularis.
Leaves crenate throughout, not very rugose.
Leaves elliptic-oblanceolate.....22. Q. martensiana.
Leaves subpandurate, becoming glabrate.....23. Q. liebmannii.
Leaves crenate only toward the apex, rugose, pandurate.
24. Q. pandurata.
Leaves large (20 cm. long or more), very short-petioled or very thick-petioled, rugose.
Leaves round-obovate, very obtuse. Peduncle thick.
25. Q. macrophylla.
Leaves more elliptic-obovate and pointed.....26. Q. resinosa.
Leaves oblanceolate-elliptic. Peduncle relatively slender.
Leaves not pandurate.
Leaves rather acuminate, crisped.....27. Q. circinata.
Leaves blunt or subacute.....28. Q. magnoliaefolia.
Leaves subpandurately narrowed.....29. Q. lutea.
CCCCC. Leaves tomentose beneath, rugose. Peduncle long.
Leaves often very large (15 cm. wide and 25 cm. long), obovate.
37. Q. decipiens.
Leaves never extremely large.
Leaves elliptic-oblong.
Leaves rather large (5 cm. wide and 10 cm. long); peduncle moderate.....30. Q. peduncularis.
Leaves smaller (scarcely 3 cm. wide and 8 cm. long); peduncle filiform.....33. Q. laeta.
Leaves obovate to broadly elliptic.
Scales of the rather large (20 to 25 mm. broad) cup lax.
31. Q. hartwegi.
Scales of the smaller cup mostly appressed.
Leaves broadly pandurate-obovate.....32. Q. laxa.

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Leaves elongate-obovate, subglabrescent__34. Q. bonplandiana.
Leaves round-obovate or subelliptic.
Leaves crenate_____35. Q. rugosa.
Leaves repandly mucronate, whitened beneath.
36. Q. reticulata.

AAA. Leaves, or most of them, entire; fruit nearly sessile.
E. Leaves tomentose beneath and rugose above, or else blue-green or very small.
Leaves relatively large (fully 2 cm. wide and 4 cm. long), very rugose and revolute.
Leaves obovate-elliptic, subcordate_____39. Q. greggii.
Leaves broadly elliptic, round-based_____40. Q. aculcingensis.
Leaves usually very small (scarcely 2 cm. wide and 3 cm. long).
Leaves rugulose and revolute, rather blunt.
Leaves deciduous_____42. Q. microphylla.
Leaves evergreen or nearly so_____43. Q. repanda.
Leaves not rugose, commonly acute_____44. Q. intricata.
EE. Leaves glabrate (scurfy-puberulent in *Q. grisea*), deciduous.
Leaves neither rugose nor coarsely veiny.
Leaves elliptic or oblong, very obtuse, blue-green.
Leaves relatively narrow (1.5 cm. wide, 4 cm. long). Acorn striate.
45. Q. engelmanni.
Leaves characteristically broader (3 cm. wide, 4.5 cm. long).
46. Q. oblongifolia.
Leaves very broadly elliptic, more or less puberulent____47. Q. grisea.
Leaves lanceolate, acute, very small_____49. Q. pringlei.
Leaves not rugose, veiny beneath. Acorn short_____19. Q. sororia.
Leaves rugose, undulate, veiny beneath. Acorn elongate.
17. Q. polymorpha.
EEE. Leaves canescent beneath, evergreen.
Leaves broadly elliptic, relatively large and usually obtuse.
53. Q. oleoides.
Leaves lance-oblong, or elliptic-oblong and pungently acute.
Cup turbinate or rounded; acorn oblong-fusiform__54. Q. fusiformis.
Cup umbonate; acorn conical_____55. Q. brandegei.
AAAA. Leaves, or many of them, pungently dentate or low-serrate.
Leaves canescent beneath.
Cup turbinate or rounded; acorn subfusiform_____54. Q. fusiformis.
Cup umbonate: acorn conical_____55. Q. brandegei.
Leaves not canescent.
Leaves moderate, elliptic-obovate.
Peduncle elongate; leaves rugose.
Margin of leaves with crenate toothing_____35. Q. rugosa
Margin of leaves with repand toothing_____36. Q. reticulata.
Margin variously entire to crenate-dentate_____41. Q. diversifolia.
Peduncle short; leaves only slightly rugose, puberulent.
38. Q. arizonica.
Leaves commonly very small; peduncle never very long.
Leaves ovate, the minute teeth near the apex, glabrous. 50. Q. toumeyi.
Leaves polymorphous in outline and margin_____51. Q. dumosa.
Leaves elliptic-ovate, toothed throughout, pubescent.
Teeth of leaves very short (1 mm.); pubescence rather woolly.
44. Q. intricata.
Teeth long (3 to 4 mm.); pubescence rather velvety. 48. Q. pungens.

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II. Fruit maturing the second season; shell of acorn woolly within, the abortive ovules lateral; stigmas short and rounded, nearly sessile; leaves entire to pungently but not aristately toothed. PROTOBALANUS.

Leaves for a time tomentose, rather large; a tree.....56. Q. tomentella.

Leaves glabrate, rather small; a shrub.....57. Q. palmeri.

III. Fruit (not known in nos. 66, 70, 72, 75, 89, 92, 94, 95, 102, 103, 109, 112) often maturing the second season; shell of acorn woolly within, the abortive ovules characteristically apical; stigmas spatulate, on elongate styles; leaves entire or toothed or often incised, the tip and teeth often aristate. ERYTHROBALANUS.

A. Leaves small, coriaceous, not rugose, usually rather pungently few-toothed.

Leaves elliptic-ovate, more or less scurfy.

Toothing of leaves repand.....58. Q. emoryi.

Toothing of leaves serrate.....60. Q. eduardi.

Leaves lanceolate.

Leaves tomentulose beneath.....59. Q. durifolia.

Leaves glabrous, or in the first subtomentose.

Leaves veiny, rather elongate.....61. Q. devia.

Leaves not veiny.....91. Q. depressa.

Leaves broadly oblong or obovate-oblong.....93. Q. sideroxyla.

AA. Leaves usually moderately large, scarcely coriaceous, all, or most of them, entire.

B. Leaves firmly tomentulose beneath, rugose, lanceolate. 62. Q. hypoleuca.

BB. Leaves firmly woolly beneath, rugose, broad.

Leaves obovate.

Leaves not aristate. Tomentum rather straight.....68. Q. fulva.

Leaves aristate from the veins.....70. Q. chicamolensis.

Leaves ovate to oblong, not aristate from the veins.....71. Q. dysophylla.

BBB. Leaves somewhat loosely fleecy beneath, rather large.

Leaves rugose.....66. Q. floccosa.

Leaves not rugose.....92. Q. orizabae.

BBBB. Leaves detachably woolly beneath, granular when denuded, rugose, narrow.

Cup rounded, not inrolled at margin.....96. Q. mexicana.

Cup turbinate, inrolled at margin.....97. Q. crassipes.

BBBBB. Leaves sparsely stellate-hairy beneath, moderate.

80. Q. oajacana.

BBBBBB. Leaves sparsely scurfy, rather small.

Leaves rugose, subcordate.

Leaves elliptic-ovate.....99. Q. castanea.

Leaves oblong.....100. Q. rugulosa.

Leaves coasely bullate rather than rugose.....80. Q. oajacana.

BBBBBBB. Leaves glabrate, but sometimes with axillary tufts of hairs beneath.

Leaves very rugose, large, acute, cordate.....75. Q. rysophylla.

Leaves neither very rugose nor very large.

Leaves characteristically very blunt and rather broad.

Acorn thick-walled; leaves slightly rugose.

Leaves granular and glabrous beneath.....76. Q. nectandraefolia.

Leaves not granular, somewhat persistently floccose.

77. Q. lingvaefolia.

Acorn thin-walled; leaves not rugose.

Leaves broadly elliptic or oblong.

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Leaves not aristate from the veins, round-based. Cup turbinate.
Twigs glabrescent ..... 78. Q. perseaefolia.
Twigs tomentose ..... 79. Q. pubinervis.
Leaves sometimes aristate, cordate ..... 73. Q. aristata.
Leaves narrowly oblong ..... 81. Q. totutlensis.
Leaves characteristically acute.
C. Leaves narrowly lanceolate (five times as long as broad). 82. Q. salicifolia.
CC. Leaves broadly lanceolate (scarcely four times as long as broad).
Leaves rather large (fully 6 cm. wide and 10 cm. long). 74. Q. uruapanensis.
Leaves moderately small.
Cup turbinately saucer-shaped ..... 83. Q. ghiesbreghtii.
Cup half-round, deeper.
Cup rather large (15 mm. broad) ..... 84. Q. tlapuxahuensis.
Cup smaller (scarcely 12 mm. broad).
Petiole relatively long (10 mm.) ..... 85. Q. lanceolata.
Petiole short (5 mm.) ..... 90. Q. ocoteaefolia.
CCC. Leaves ovate-elliptic.
Leaves somewhat revolute ..... 77. Q. linguaefolia.
Leaves not revolute ..... 92. Q. orizabae.
CCCC. Leaves lanceolate-oblanceolate ..... 86. Q. laurina.
AAA. Leaves rather large, undulate or pungently dentate, rugose, tomentose. 67. Q. crassifolia.
AAAA. Leaves, or many of them, serrate, scarcely coriaceous.
D. Leaves very rugose, or else densely tomentulose beneath.
E. Leaves tomentulose beneath.
Leaves very rugose.
Leaves large, obovate, toothed above ..... 63. Q. scytophylla.
Leaves rather small (scarcely 4 cm. wide and 6 cm. long), subcordate.
Leaves obovate ..... 64. Q. omissa.
Leaves oblong ..... 65. Q. pulchella.
Leaves only slightly rugose, large.
Leaves oblong-oblanceolate ..... 111. Q. calophylla.
Leaves obovate ..... 112. Q. candicans.
EE. Leaves sparingly fleecy beneath, rather large. Teeth few. 66. Q. floccosa.
EEE. Leaves tomentose beneath.
Leaves rather large.
Leaves obovate-elliptic, the teeth few, toward the end ..... 68. Q. fulva.
Leaves ovate-elliptic, the teeth usually numerous and coarse. 69. Q. stipularis.
Leaves small (scarcely 3 cm. wide and 6 cm. long).
Leaves rather ovate ..... 71. Q. dysophylla.
Leaves elliptic-oblong ..... 72. Q. splendens.
DD. Leaves only slightly rugose, scurfy or fleecy beneath.
Leaves oblanceolate-elliptic, the teeth toward the end, scurfy.
Petiole moderate (often 10 mm. long) ..... 94. Q. chrysophylla.
Petiole short (5 mm.). Leaves often lanceolate and entire. 95. Q. tridens.
Leaves lanceolate or oblong.
Teeth toward the apex of the blade ..... 98. Q. lanigera.
Teeth along the side of the blade ..... 99. Q. castanea.

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DDD. Leaves not rugose.
Leaves furfuraceous beneath. Teeth small.....107. Q. furfuracea.
Leaves glabrate, but sometimes with axillary tufts beneath.
Leaves thick and small, scarcely venulose.....91. Q. depressa.
Leaves thin, or else veiny.
Leaves moderate in size (scarcely 4 cm. wide and 12 cm. long).
F. Leaves lanceolate or lance-oblong; teeth small.
Leaves rather broad, or rounded at base.
Leaves evergreen, subcoriaceous.....61. Q. devia.
Leaves deciduous.
Leaves not very veiny.....106. Q. sartorii.
Leaves very venulose.....108. Q. grahami.
Leaves narrower (four times as long as broad), and subacute at base.
Leaves neither revolute nor very prominently veiny. 89. Q. affinis.
Leaves somewhat revolute and more venulose. 102. Q. cortesii.
FF. Leaves ovate-lanceolate. venulose.....108. Q. grahami.
FFF. Leaves oblanceolate, with coarse teeth.
Twigs and petioles glabrous.....87. Q. major.
Twigs and petioles pubescent.....88. Q. barbinervis.
FFFF. Leaves oblong, rather pungently tooted. 93. Q. sideroxyla.
Leaves large, with rather coarse teeth.
Leaves lanceolate or oblanceolate.
Leaves elongate (four times as long as broad), much crisped. 103. Q. huitamalcana.
Leaves broader (three times as long as broad), scarcely crisped.
Acorn moderately small.
Acorn depressed, nearly included.....101. Q. grandis.
Acorn ovoid, scarcely half included.
Leaves evergreen.....109. Q. acutifolia.
Leaves deciduous.....110. Q. xalapensis.
Acorn very large (40 mm. long).....104. Q. chiapasensis.
Leaves ovate. Acorn very large.....105. Q. skinneri.

1. **Quercus insignis** Mart. & Gal. Bull. Acad. Brux. 10²: 219. 1843.

Veracruz; type locality, on the flanks of Mount Orizaba.

Large deciduous tree with stout villous twigs; buds glabrous, 5 to 7 mm. in diameter, 10 to 15 mm. long; leaves large (4 to 7 cm. wide, 9 to 16 cm. long), rugose, somewhat hairy beneath, oblanceolate-obovate, obtuse or submucronate, short-petioled, usually short-serrate above; acorn depressed, blunt, 50 to 70 mm. in diameter, half-included, the saucer-shaped cup with thick squarrose scales. "Encina," "aoatl," "ahoaquahuitl" (*Ramírez*).

2. **Quercus strombocarpa** Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 176. 1854.

Veracruz; type locality, San Bartolomé.

Resembling the preceding; leaves large (6 to 9 cm. wide, 14 to 17 cm. long), elliptic-obovate; acorn conical, pointed, 50 mm. in diameter, the lower third included in the very turbinate cup. "Encina," "aoatl," "ahoaquahuitl" (*Ramírez.*)

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3. **Quercus cylobalanoides** Trel. Proc. Amer. Phil. Soc. **54**: 11. 1915.

Chiapas; type locality, Finca Irlanda.

Large deciduous tree with stout glabrous twigs; leaves large (6 to 9 cm. wide, 15 to 25 cm. long), glabrous, oblanceolate, acute, short-petioled, coarsely and acutely mucronate-serrate; acorn elongate-ovoid, 40 to 50 mm. in diameter, 50 to 60 mm. long, one-third included, the turbinately goblet-shaped cup with abortive scales connate in rings.

4. **Quercus excelsa** Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 174. 1854.

Veracruz; type locality, Matlaluga.

Twigs rather slender, glabrous; buds glabrous, small; leaves deciduous, large (5 to 11 cm. wide; 15 to 25 cm. long), glabrous, oblanceolate, acute or subacuminate, subsessile or short-petioled, mostly cuneate, subentire or typically coarsely but acutely serrate to below the middle; acorn ovoid or elongate-ovoid, characteristically 25 to 30 mm. in diameter, 40 to 50 mm. long, the very shallow saucer-shaped cup closely covered by rather small and blunt scales.

5. **Quercus galeottii**[1] Mart. Bull. Acad. Brux. **10**[2]: 220. 1843.

Veracruz; type locality, Santiago de Huatusco.

Rather large (subevergreen?) tree with stout glabrescent twigs and small glabrous buds; leaves large (5 to 7 cm. wide, 12 to 17 cm. long), glabrous, oblanceolate, acute, subcuneately short-petioled, acutely low crenate-serrate; acorn broadly ovoid, 25 to 40 mm. in diameter, 30 to 40 mm. long, one-third included, the more or less flaring, rounded cup with subappressed pointed scales.

6. **Quercus pinalensis** Trel.

Quercus cuneifolia Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 189. 1854. Not *Q. cuneifolia* Raf. 1838.

Type from Cerro de Pinal.

Twigs rather slender, glabrous; leaves (deciduous?) large (6 to 10 cm. wide, 15 to 25 cm. long), glabrous, broadly oblanceolate, acute, more or less cuneate, short-petioled, coarsely and bluntly serrate-lobed; fruit unknown.

7. **Quercus chinantlensis** Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 179. 1854.

Veracruz; type locality, Lacoba.

Twigs rather slender, glabrous; leaves (deciduous?) large (5 to 6 cm. wide, 14 cm. long), glabrous, oblanceolate, long-acute or subacuminate, subsessile, cuneate and entire below, very coarsely and rather bluntly repand-serrate above; fruit unknown.

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[1] Henri Galeotti was born in France in 1814. He sailed from Hamburg for Mexico in 1835, reaching Veracruz in December. He spent six months at Jalapa, collecting living plants, especially orchids. He passed on to Vigas and Perote, and finally Puebla and Mexico. He botanized at various times in the state of Mexico, part of the time in company with Ehrenberg. In 1835 he spent two or three months in Hidalgo. At the end of that year he visited Querétaro and later Jalisco and Tepic, and in 1837 Guanajuato. He ascended Popocatepetl in June, 1837; in July he visited Michoacán, and in December Aguascalientes and San Luis Potosí. In April, 1838, he returned to Veracruz and made his headquarters at the German colony at Mirador. In August of that year, in company with Funck, Linden, and Ghiesbreght, he ascended the Pico de Orizaba, remaining with his companions for 11 days in a cavern on the mountain. In 1839 he visited Puebla and Oaxaca. In 1840 he returned to Europe, where he become director of the Botanical Garden of Brussels. He died in 1858. Descriptions of some of the new species discovered were published by himself and Martens in the Bulletin de l'Académie Royale de Belgique.

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8. **Quercus leiophylla** A. DC. in DC. Prodr. **16**[2]: 71. 1864.

Veracruz; type locality, San Bartolomé.

Deciduous tree with rather slender glabrous twigs and small rounded glabrous buds; leaves rather small (2 to 3 cm. wide, 7 to 12 cm. long), glabrous, lanceolate or oblanceolate, acute at both ends, short-petioled, subentire to typically coarsely serrate above the middle; acorn ovoid, 20 mm. in diameter, 30 mm. long, one-third included, the half-round cup with acute appressed scales.

9. **Quercus lancifolia** Cham. & Schlecht. Linnaea **5**: 78. 1830.

Veracruz; type locality, Jalapa.

Deciduous tree with slender glabrous twigs and small glabrous buds; leaves rather small (2 to 3 cm. wide, 8 to 12 cm. long), glabrous, venulose, flat, slightly paler beneath, lanceolate, acute at both ends, subentire or coarsely, serrate above; acorn elongate-ovoid, scarcely 15 mm. in diameter and 25 mm. long, the saucer-shaped cup with blunt appressed scales.

10. **Quercus glabrescens** Benth. Pl. Hartw. 56, 348. 1840.

Hidalgo and Veracruz; type from Real del Monte, Hidalgo.

Deciduous tree with slender, stellate-villous or glabrate twigs and small glabrous buds; leaves rather small (3 cm. wide, 6 to 10 cm. long), rugulose and glabrate above, often stellate-pubescent beneath, elliptic-oblong or lanceolate, acute, mostly rounded at base, short-petioled, coarsely serrate above with revolute notches; acorn ovoid, 10 mm. in diameter, 15 mm. long, less than one-third included, the shallow cup with acute, rather lax scales.

An entire-leaved form is f. *integrifolia Liebm.* in DC. Prodr. **16**[2]: 35. 1864.

11. **Quercus glaucoides** Mart. & Gal. Bull. Acad. Brux. **10**[2]: 209. 1843.

Quercus cordata Mart. & Gal. Bull. Acad. Brux. **10**[2]: 211. 1843.

Oaxaca; type locality, in the Mixteca Alta.

Medium-sized deciduous tree with slender, glabrescent, and often lightly glaucous twigs, and small, at first hairy buds; leaves moderate (4 cm. wide, 8 cm. long), blue-green, glabrescent, slightly glaucous beneath, subelliptic, obtuse, cordate, short-petioled, rather crenately repand above; acorn unknown, the small half-round cup with acute appressed scales.

12. **Quercus glaucophylla** Seemen, Bot. Jahrb. Engler **29**: 95. 1900.

Oaxaca; type locality, San Felipe.

Differing from the preceding in its obovate crenate leaves; acorn ovoid, half-included, 10 mm. in diameter and 15 mm. long.

13. **Quercus tuberculata** Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 181. 1854.

Sinaloa (?); type locality somewhere in the western Sierra Madre.

Deciduous glabrous tree with rather slender twigs and small buds; leaves moderate (3 to 5 cm. wide, 8 to 10 cm. long), elliptic-oblanceolate, rather obtuse at both ends or the base very acute, short-petioled, crenate and often crisped; acorn round-ovoid, 12 mm. in diameter, 15 mm. long, scarcely one-third included, the suburceolate cup with keeled or tuberculate, acute, appressed scales.

14. **Quercus idonea** Goldman, Contr. U. S. Nat. Herb. **16**: 321. 1916.

Baja California; type locality, Sierra de la Laguna.

Small deciduous tree with rather slender twigs and small buds; leaves moderate or rather large (4 to 6 cm. wide, 10 to 12 cm. long), puberulent or glabrate, elliptic to ovate or oblong, rather acute at both ends or the base subtruncate, short-petioled, crisped, somewhat coarsely subcrenate, especially above; acorn oblong-ovoid, 10 to 15 mm. in diameter, 20 to 25 mm. long, the deeply saucer-shaped cup with acute subappressed scales. "Encina roble."

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15. Quercus nudinervis Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 182. 1854.

Type locality, in the Cerro de Pinal.

Twigs moderate, glabrous; leaves large (5 to 9 cm. wide, 13 to 17 cm. long), glabrescent, obovate or oblanceolate, obtuse or bluntly acuminate, rather decurrent on the short moderate petiole, low-crenate; fruit unknown.

16. Quercus standleyi Trel., sp. nov.

Sonora; type in the U. S. National Herbarium, no. 635607, collected in the Sierra de Alamos, in 1910, by Rose, Standley, and Russell (no. 12789).

Deciduous glabrous tree with rather slender orange-brown twigs and small round buds with tomentulose-ciliate scales; leaves rather large (6 to 12 cm. wide, 15 to 24 cm. long), elliptic-obovate, obtuse at both ends, short-petioled, coarsely crenate, paler beneath, with white veins and margin; fruit unknown.

17. Quercus polymorpha Cham. & Schlecht. Linnaea **5**: 78. 1830.

Quercus petiolaris Benth. Pl. Hartw. 55, 348. 1840.

Quercus varians Mart. & Gal. Bull. Acad. Brux. **10**[2]: 214. 1843.

Veracruz, Nuevo León, and San Luis Potosí; type locality, near Jalapa, Veracruz. Said to be the chief component of the forest on the Uaxac Canal, Guatemala.

Medium-sized deciduous tree with rather slender glabrous twigs and somewhat hairy buds 4 mm. in diameter and 6 mm. long; leaves rather large (3 to 6 cm. wide, 7 to 13 cm. long), lightly glaucous and sometimes rusty-woolly beneath, ovate-lanceolate or elliptic, obtuse, often subcordate, slender-petioled, entire or crenately few-toothed at end; acorn oblong, about 10 mm. in diameter and 20 mm. long, half included, the rounded cup with acute appressed scales. "Encina" (*Ramírez*).

18. Quercus juergensenii[1] Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 188. 1854.

Quercus jurgensii A. DC. in DC. Prodr. **16**[2]: 78. 1864.

Oaxaca; type locality, Chinantla.

Apparently closely related to the preceding, with short-petioled, cuneate, rather large leaves (4 cm. wide, 7 to 10 cm. long), and oblong acorns 15 mm. in diameter and 20 to 25 mm. long.

Not recently recognized.

19. Quercus sororia Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 175. 1854.

Oaxaca; type locality, Chinantla.

Twigs rather slender, glabrescent; buds small, glabrous; leaves deciduous, moderate (4 cm. wide, 10 cm. long), slightly glaucous and exceptionally fleecy beneath, elliptic-oblong, obtuse, rounded at base or subcordate, short-petioled, entire; acorn round-ovoid, 15 mm. in diameter and 20 mm. long, one-third included, the rounded cup with thin, acute, rather loose scales.

20. Quercus germana Cham. & Schlecht. Linnaea **5**: 78. 1830.

Veracruz and adjacent San Luis Potosí; type locality, Jalapa, Veracruz.

Deciduous tree with rather slender glabrous twigs; leaves oblong, medium-sized (4 cm. wide, 10 cm. long), rather obtuse, round-based, glabrous, slightly glaucous beneath, short-petioled, crenately few-toothed at end; acorn subglobose, 15 mm. in diameter, nearly included, the round cup with rather coarse keeled acute appressed scales.

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[1] Little is known of Jürgensen, who collected in Mexico for Galeotti, after the latter left that country. His collections were obtained chiefly in the state of Oaxaca.

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21. Quercus glaucescens Humb. & Bonpl. Pl. Aequin 2: 29. 1809.

Sinaloa; type locality, Caieguale.

Large deciduous tree with rather slender glabrous twigs and small glabrous buds; leaves large (5 to 8 cm. wide, 12 to 16 cm. long), densely pale-tomentulose beneath, broadly oblanceolate, obtuse or bluntly subacuminate, cuneate at base, short-petioled, repand or bluntly few-toothed toward the end; fruit unknown. "Encina memelito" (*Ramírez*).

22. Quercus martensiana Trel.

Quercus affinis Mart. & Gal. Bull. Acad. Brux. 10 [2]: 222. 1843. Not *Q. affinis* Scheidw. 1837.

Veracruz; type locality, Zacuapam.

Deciduous tree with rather slender glabrescent twigs and small hairy buds; leaves rather large (3 to 5 cm. wide, 12 cm. long), glabrescent above, somewhat tomentulose and hairy beneath, elliptic-oblanceolate to ovate, obtuse at both ends or mucronate and somewhat cordate, short-petioled, subentire or undulate or repandly few-toothed; acorn subglobose, 10 to 15 mm. in diameter, half included, the rounded cup with thin blunt appressed scales.

23. Quercus liebmannii Oerst. in Liebm. Chênes Amér. Trop. 16. 1869, name only.

Oaxaca; type locality, Cuesta de San Juan del Estado.

Twigs rather slender, reddish, glabrescent; buds small, glabrescent; leaves (deciduous?) large (5 to 7 cm. wide, 13 to 17 cm. long), subpersistently pale-tomentose beneath, oblanceolate-obovate, bluntly subacuminate, the narrowed base subcordate, short-petioled, crenate-sinuate; fruit unknown.

24. Quercus pandurata Humb. & Bonpl. Pl. Aequin. 2: 28. 1809.

Quercus obtusata pandurata A. DC. in DC. Prodr. 16 [2]: 27. 1864.

Michoacán; type locality, Ario.

Small (deciduous?) tree with rather slender glabrescent twigs and small, transiently fleecy buds; leaves rather large (6 cm. wide, 14 cm. long), finely stellate-scurfy beneath, pandurately oblanceolate-oblong, rather acute, rounded or subtruncate at base, moderately petioled, crenate or somewhat shallowly and bluntly toothed above; mature fruit unknown, the young cups with acute, somewhat keeled, appressed scales.

With very obtuse, more elongate, and entire leaves it is *Q. obtusata* Humb. & Bonpl. (op. cit. 26. 1809).

25. Quercus macrophylla Née, Anal. Cienc. Nat. 3: 274. 1801.

Quercus magnoliaefolia macrophylla A. DC. in DC. Prodr. 16 [2]: 27. 1864.

Coahuila to Jalisco, Guerrero, and San Luis Potosí; type locality, between Tixtla and Chilpancingo, Guerrero.

Rather small deciduous tree with stout, yellow-tomentose but glabrescent twigs, and glabrescent buds 6 mm. in diameter and 10 mm. long; leaves very large (13 to 30 cm. wide and 25 cm. long or more), subglabrescent above, usually persistently tomentulose beneath, round-obovate, very obtuse, rounded or slightly auriculate-cordate at base, subsessile, crisped, undulate to coarsely crenate-toothed; acorn elongate-ovoid, 20 mm. in diameter, 35 mm. long, scarcely half included, the broad cup with subappressed acute scales.

26. Quercus resinosa Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 182. 1854.

Sonora ?; type locality somewhere in the western Sierra Madre.

Deciduous tree with stout tomentose twigs; leaves large (10 to 15 cm. wide, 20 to 30 cm. long), glabrescent above, gray-puberulent beneath and resinous-punctate along the veins, oblanceolate-obovate, obtuse or subacute, slightly cordate, crisply repand, on short thick petioles; fruit unknown.

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27. Quercus circinata Née, Anal. Cienc. Nat. 3: 272. 1801.

Type locality, between Tixtla and Chilpancingo, Guerrero.

Small deciduous tree, 8 to 10 meters high, with stout, tomentulose or glabrescent twigs and small canescent buds; leaves large (6 to 10 cm. wide, 15 to 25 cm. long), glabrate above, velvety beneath, oblanceolate, blunt-acuminate, rounded at base, short-petioled, crisped, crenate-toothed; acorn elongate-ovoid, 15 mm. in diameter, 20 to 30 mm. long, one-third included, the half-round cup with acute appressed scales. "Encina roble." (Michoacán, Guerrero).

28. Quercus magnoliaefolia Née, Anal. Cienc. Nat. 3: 268. 1801.

Type locality, between Tixtla and Chilpancingo, Guerrero.

Like the preceding; differing little except in its more oblanceolate-obovate, less acuminate, and less crenate leaves.

29. Quercus lutea Née, Anal. Cienc. Nat. 3: 268. 1801.

Type locality, between Tixtla and Chilpancingo, Guerrero.

Like the preceding; differing little except in its somewhat pandurate leaves.

30. Quercus peduncularis Née, Anal. Cienc. Nat. 3: 270. 1801.

Quercus tomentosa Willd. Sp. Pl. 4: 437. 1805.

Type locality, in the western Sierra Madre, above the Río Mescala, between Acapulco and Mexico City.

Small (deciduous?) tree, with moderate glabrescent twigs and small hairy buds; leaves rather large (5 cm. wide, 12 cm. long), scurfy along the midrib above and rather thinly woolly beneath, elongate-elliptic, subacute, somewhat cordate, short-petioled, sinuate; fruit stalked; acorn ovoid, 10 mm. in diameter, 15 mm. long, less than half included, the rather shallow cup with acute appressed scales. "Encina" (*Ramírez*).

31. Quercus hartwegi Benth. Pl. Hartw. 432. 1840.

Quercus obtusata hartwegi A. DC. in DC. Prodr. 16[2]: 27. 1864, in part.

Quercus pandurata hartwegi Wenzig, Jahrb. Bot. Gart. Berlin 3: 197. 1884.

Type locality, Tuxpan, near Angangueo, Michoacán.

Deciduous tree with moderate glabrescent twigs and small hairy buds; leaves moderate (4 to 5 cm. wide, 7 to 8 cm. long), characteristically velvety beneath and along the midrib above, broadly elliptic or sometimes pandurately obovate, obtuse, slightly cordate, short-petioled, repand to coarsely crenate or toothed; fruit often long-stalked; acorn round-ovoid, 15 mm. in diameter, half included, the flaring saucer-shaped cup 20 to 25 mm. in diameter, with acute, rather loose scales.

32. Quercus laxa Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 181. 1854.

Quercus xylina Scheidw. Hort. Belg. 1837: 321. 1837.

Quercus reticulata laxa Wenzig, Jahrb. Bot. Gart. Berlin 3: 195. 1884.

Jalisco, Tepic, Colima, and Michoacán; type locality, somewhere in the western Sierra Madre.

Very like the preceding; fruiting cup smaller (15 mm. broad), with more keeled and appressed scales.

33. Quercus laeta Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 179. 1854.

Quercus pandurata laeta Wenzig, Jahrb. Bot. Gart. Berlin 3: 197. 1884.

San Luis Potosí, Mexico, and Puebla; type locality, Grande.

Twigs rather slender, somewhat scurfy or glabrescent; buds small, glabrescent; leaves rather small (2 to 3 cm. wide, 7 to 8 cm. long), short-tomentose beneath and on the midrib above, lanceolate or oblong-elliptic, obtuse, rounded at base, very short-petioled, entire or crenate; fruit slender-peduncled; acorn ovoid, 10 mm. in diameter, 15 mm. long, the thin half-round cup with small subacute appressed scales.

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34. Quercus bonplandiana Sweet, Hort. Brit. 370. 1826.

Quercus ambigua Humb. & Bonpl. Pl. Aequin. 2: 51. 1809. Not *Q. ambigua* Michx. 1901.

Hidalgo; type locality, Morán.

Very like the preceding; differing in its more narrowly obovate, low-crenate, longer-petioled leaves; fruit unknown.

35. Quercus rugosa Née, Anal. Cienc. Nat. 3: 275. 1801.

Quercus spicata Humb. & Bonpl. Pl. Aequin. 2: 46. 1809.

Quercus macrophylla rugosa Wenzig, Jahrb. Bot. Gart. Berlin 3: 198. 1884.

Hidalgo; type locality, in the Cerro de las Navajas, near Morán.

Twigs rather stout and tomentose; buds small, subpubescent; leaves deciduous, moderate (3 to 5 cm. wide, 8 to 10 cm. long), glabrate above, dingy-tomentose and reticulate-veiny beneath, elliptic-obovate, obtuse, cordate, rather short-petioled, callously crenate or coarsely and subpungently low-serrate above; fruit long-peduncled; acorn unknown, the rather small shallow cup with acute appressed scales.

36. Quercus reticulata Humb. & Bonpl. Pl. Aequin. 2: 40. 1809.

Chihuahua to Mexico and Oaxaca; type locality, Santa Rosa to Guanajuato.

Rather large deciduous tree with moderate, somewhat tomentose twigs and small glabrescent buds; leaves rather small (3 to 4 cm. wide, 6 to 7 cm. long), rugose, stellate or brown-tomentose beneath, the midrib scurfy above, obovate, very obtuse, rounded at base or subcordate, short-petioled, repandly callous-dentate above; fruit peduncled; acorn ovoid, 10 mm. in diameter, 15 to 20 mm. long, scarcely half included, the rounded cup with acute, appressed or loose scales; wood hard, close-grained, brown, its specific gravity about 0.95. "Palo colorado" (San Luis Potosí, *Palmer*); "encina de miel" (San Luis Potosí, Mexico); "encina" (San Luis Potosí); "encina quiebra-hacha" (Hidalgo *Villada*); "aoatl," "ahoaquahuitl" (Nahuatl, *Ramírez*); "chaparro," "encina prieta" (Oaxaca, *Seler*); "tnu-yaha," "tnu-yáa" (Oaxaca, Mixtec, *Seler*).

Palmer reports the use of the acorns as a substitute for coffee in San Luis Potosí.

37. Quercus decipiens Mart. & Gal. Bull. Acad. Brux. 10[2]: 214. 1843.

Veracruz; type locality, Mirador.

Moderately large deciduous tree with rather stout glabrescent twigs and medium-sized rusty-hairy buds; leaves unusually large (12 to 16 cm. wide, 18 to 25 cm. long), glabrate above, more or less puberulent and whitened beneath, obovate, bullate, short-petioled, very obtuse, repand or low-toothed above; fruit very long-peduncled (peduncle up to 25 cm. long); acorn oblong, 12 mm. in diameter, 20 mm. long, scarcely one-third included, the half-round cup with acute, rather loose scales.

38. Quercus arizonica Sarg. Gard. & For. 8: 92. 1895.

Sonora and Chihuahua. Arizona; type locality, Huachuca Mountains.

Deciduous shrub or small tree with slender tomentose twigs and glossy glabrate small buds; leaves small (scarcely 3 cm. wide and 6 cm. long), blue-green, somewhat crisped and revolute, glabrate above, more or less stellate and reticulate beneath, broadly elliptic or subovate, obtuse or acute, subcordate, short-petioled, entire or repand or distantly denticulate or serrulate; acorn ovoid, 10 mm. in diameter, 15 to 20 mm. long, nearly half included, the rounded cup with thickened acute appressed scales; wood hard and strong, close-grained, dark brown to nearly black, the specific gravity slightly over 1.00.

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39. Quercus greggii (A. DC.) Trel.

Quercus reticulata greggii A. DC. in DC. Prodr. 16 [2]: 34. 1864.

Coahuila; type locality, San Antonio, near Saltillo.

Rather small evergreen trees with moderate, tomentose or more or less glabrescent twigs and small hairy buds; leaves rather small (3 to 5 cm. wide. 4 to 7 cm. long), rugose, revolute, granular or puberulent on the midrib above, rusty stellate-fleecy beneath, shortly elliptic-obovate, mucronately very obtuse, cordate, short-petioled, entire or slightly repand above; acorn conic-ovoid, about 10 mm. in diameter and 20 mm. long, the shallow cup with acute appressed scales.

40. Quercus aculcingensis Trel.

Quercus reticulata crassifolia Oerst. in Liebm. Chênes Amér. Trop. 20. 1869.

Oaxaca; type locality, Puente Colorado on the Cuesta de Aculcingo.

Twigs moderate, dingy-woolly; buds small, glabrate; leaves deciduous, small (2 cm. wide, 4 cm. long), rugose, revolute, densely tomentose beneath, the midrib granular above, elliptic, rather obtuse at both ends, short-petioled, entire; fruit unknown.

41. Quercus diversifolia Née, Anal. Cienc. Nat. 3: 270. 1801.

Quercus tomentosa diversifolia A. DC. in DC. Prodr. 16 [2]: 33. 1864.

Type locality, between Chalma and Santa Rosa, Veracruz.

A scarcely placeable shrub, said to be 3 to 5 meters high, with rather small leaves (2 cm. wide, 2.5 to 7 cm. long) tomentose beneath, ovate, oblong, or elliptic in outline, and subentire to crenate-dentate on the same branch; fruit on a peduncle 5 cm. long.

42. Quercus microphylla Née, Anal. Cienc. Nat. 3: 264. 1801.

Guanajuato, Hidalgo, and Mexico; type from Guanajuato.

Intricately branched deciduous low shrub with slender tomentose twigs and glabrescent ovoid buds 2 mm. in diameter and 4 to 5 mm. long; leaves small (1 to 2 cm. wide, 2 to 4 cm. long), rugose, revolute, and concave, scurfy above, woolly beneath, elliptic-oblong, mostly obtuse at both ends, very short-petioled, entire or undulate or crenately toothed above; acorn ovoid, 10 mm. in diameter, 15 mm. long, one-third or more included, the half-round cup with acute appressed scales. "Encina capulincillo" (Mexico, *Ramírez*).

43. Quercus repanda Humb. & Bonpl. Pl. Aequin. 2: 31. 1809.

Hidalgo and adjacent San Luis Potosí; type locality, El Jacal, between Real del Monte and Morán, Hidalgo.

Intricately branched subevergreen shrub with slender tomentose twigs and small glabrescent buds; leaves small (1 to 2 cm. wide, 3 to 4 cm. long), rugose, undulately revolute, sparingly scurfy above, woolly beneath, elliptic to ovate or obovate, commonly obtuse at both ends, very short-petioled, entire or sparingly low-toothed above; acorn round-ovoid, 10 mm. in diameter, 12 to 15 mm. long, nearly half included, the rounded cup with acute appressed scales. "Encina," "encina negra," "encina chaparro" (Hidalgo).

44. Quercus intricata Trel.

Quercus microphylla crispata A. DC. in DC. Prodr. 16 [2]: 36. 1864. Not *Q. crispata* Steven, 1857.

Coahuila and adjoining Zacatecas; type locality, Buena Vista, near Saltillo, Coahuila.

Intricately branched deciduous shrub with slender tomentose twigs and small glabrescent buds; leaves small (scarcely 1 to 2 cm. wide and 3 to 5 cm. long), crisped and revolute, stellate-scurfy above, closely tomentose beneath, subellip-

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tic, typically acute, subcordate and typically entire, very short-petioled; acorn round, subincluded, scarcely 10 mm. in diameter, the rounded cup with acute appressed scales.

45. **Quercus engelmanni**[1] Greene in Greene & Kellogg, Ill. West Amer. Oaks 32. 1889.

Southeastern California; type locality, between San Diego and Los Angeles; said to reach adjoining Baja California.

A moderate-sized tree very like the following, except in its broader leaves, but of distinct geographic range; wood hard, strong but brittle, close-grained, brown, its specific gravity about 0.94.

The wood is said to check badly in drying and to be useful only for fuel.

46. **Quercus oblongifolia** Torr. in Sitgreaves, Rep. Zuñi & Col. 173. 1853.

Chihuahua and Sonora. Arizona; type from "western New Mexico."

Moderate-sized tree with slender, glabrescent, often pruinose twigs and small red buds with ciliate scales; leaves (deciduous?) small (usually 1 to 2 cm. wide and 3 to 4 cm. long), glabrous, paler beneath, elliptic or oblong, rounded at both ends or subcordate, entire or coarsely and crenately few-toothed, the usually pruinose petiole short; acorn elongate-ovoid, 10 to 15 mm. in diameter, one-third included, the half-round cup with rather broad and blunt, keeled, appressed scales; wood hard and strong but brittle, very dark brown, heavy.

47. **Quercus grisea** Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 171. 1854.

Chihuahua, and apparently to Zacatecas. Western Texas, the type locality not specified.

Shrub or small tree with slender tomentose twigs and small round red buds with puberulent outer scales; leaves deciduous, small (scarcely 2 cm. wide and 4 cm. long), thin, blue-green, minutely puberulent above and dull, though glossy when abraded, stellate-scurfy beneath, elliptic or ovate, mucronately subacute, often cordate, short-petioled, entire; acorns paired on a short slender peduncle, ellipsoid, 8 mm. in diameter, 12 mm. long, scarcely one-third included, the half-round cup with rather acute appressed scales. "Encina prieta," "encina blanca" (Durango, *Palmer*).

The wood is useful only for fuel.

48. **Quercus pungens** Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 171. 1854.

Quercus undulata pungens Engelm. Trans. Acad. Sci. St. Louis **3**: 392. 1876.

Chihuahua. New Mexico.

Shrub or small tree with slender tomentulose twigs; leaves deciduous, small (scarcely 2 cm. wide and 3 cm. long), from scurfy glabrescent, crisped, elliptic, pungently acute, rounded at base, very short-petioled, with about 4 large pungent deltoid teeth on each side; acorn ovoid, scarcely 8 mm. in diameter and 12 mm. long, half included, the rounded cup with small appressed scales.

49. **Quercus pringlei** Seemen, Bot. Jahrb. Engler **29**: 96. 1900.

Coahuila; type locality, in the Carneros Pass below Saltillo.

Shrub with slender subglabrescent twigs and minute round glabrous buds; leaves (deciduous?) very small (scarcely 1 cm. wide and 2.5 cm. long), glabrous, lance-elliptic, subaristately acute, rounded at base, mostly entire, the

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[1] George Engelmann (1809–1884), a native of Germany, lived most of his life at St. Louis, Missouri, where he was engaged in the practice of medicine. An enthusiastic botanist, Engelmann devoted most of his botanical labors to the study of the more difficult groups of plants, such as the *Cactaceae*, *Yucca*, *Agave*, *Quercus*, etc. He described many Mexican species of these and other groups.

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very short petiole somewhat tomentose; acorn round-ovoid, scarcely 10 mm. in diameter, fully half included, the rounded cup with somewhat thickened and blunt appressed scales.

50. Quercus toumeyi Sarg. Gard. & For. **8**: 92. 1895.

Sonora. Arizona; type locality, Bisbee.

Shrub or small tree with slender tomentulose twigs and small pubescent buds; leaves deciduous, very small (scarcely 1 cm. wide and 2 cm. long), smooth or papillate above, sparingly velvety beneath, elliptic, mucronately acute, subcordate, entire or pungently few-toothed above, with very short hairy petiole; acorn oblong, scarcely 8 mm. in diameter and 12 mm. long, less than half included, the rounded cup with rather blunt appressed scales; wood hard, close-grained, brown.

51. Quercus dumosa Nutt. N. Amer. Sylv. **1**: 7. 1842.

California; type locality, Santa Barbara. Extending into Baja California, in several foliage forms, of which one, with very small, ovate-elliptic, pungently dentate leaves scarcely 15 mm. wide and 25 mm. long, is var. *turbinella* Jepson (Silva Calif. 218. 1910; *Q. turbinella* Greene in Greene & Kellogg, Ill. West. Amer. Oaks 37. 1889).

Deciduous shrub with slender, usually glabrescent twigs; leaves small (commonly less than 2 cm. wide and 5 cm. long), polymorphous, more or less persistently tomentulose beneath, short-petioled; fruit typically slender-peduncled, the moderate-sized or small oblong acorn scarcely half included in the finely scaly, half-round cup.

This species is said to be the one whose acorns were most used as food by the Indians of southern California.

52. Quercus breviloba (Torr.) Sarg. Gard. & For. **8**: 93. 1895.

Quercus obtusifolia breviloba Torr. U. S. & Mex. Bound. Bot. 266. 1859.

Quercus annulata Buckl. Proc. Acad. Phila. **1860**: 445. 1860. Not *Q. annulata* Smith, 1819.

Nuevo León. Texas; type locality in Howard County.

Large deciduous shrub or small tree with rather slender glabrous buff twigs; leaves rather small (3 to 6 cm. wide, 6 to 12 cm. long), glabrous and glossy green above, glabrate but pale or microscopically silvery-tomentulose beneath, elliptic-obovate, obtuse, mostly acute at base, short-petioled, usually undulate or with a few short round lobes; acorn ovoid, scarcely 8 mm. in diameter and 12 mm. long, half included, the rounded cup with acute, rather close scales; wood hard and strong, brittle, brown, close-grained.

53. Quercus oleoides Cham. & Schlecht. Linnaea **5**: 79. 1830.

Veracruz, Chiapas, and Tabasco; type locality, Hacienda de la Laguna, near Jalapa, Veracruz. British Honduras, Guatemala, Honduras, and Costa Rica.

Rather large broad-topped evergreen tree with slender gray-tomentulose twigs and small reddish glabrate buds; leaves mostly rather small (3 to 6 cm. wide, 6 to 8 cm. long, but exceptionally twice as large), glabrous and green above, minutely pale-tomentulose beneath, revolute, obovate-elliptic, rather obtuse, subcuneate, rather short-petioled, typically entire; fruit mostly peduncled; acorn ovoid, 10 mm. in diameter, 15 to 20 mm. long, about half included, the turbinate cup with keeled acute appressed scales in vertical rows. "Roblecito" (Guatemala, Honduras).

A juvenile form with obovate toothed leaves is *Q. lutescens* Mart. & Gal. Bull. Acad. Brux. **10**[2]: 219. 1843.

54. Quercus fusiformis Small, Bull. Torrey Club **28**: 357. 1901.

Quercus virginiana fusiformis Sarg. Bot. Gaz. **65**: 448. 1918.

Coahuila and Nuevo León. Texas; type locality, Kerrville.

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Small evergreen tree with slender tomentulose twigs and minute round red velvety buds; leaves small (1 cm. wide, 3 to 5 cm. long), minutely canescent beneath, narrowly oblong-lanceolate, mucronately acute, rounded at base, entire or with 1 or 2 asymmetric teeth, the short petiole tomentulose; fruit long-peduncled; acorn fusiform-oblong, 10 mm. in diameter, 20 to 25 mm. long, less than one-third included, the turbinate cup with acute appressed scales in somewhat evident vertical rows.

This and *Q. oleoides* are probably the species which have been reported from Mexico as *Q. virginiana* Mill. (*Q. virens* Ait.). The following are some of the vernacular names reported: "Maculi" (Nuevo León, Veracruz); "maquilihuatl" (Veracruz); "texmole"; "roble"; "roble serrano"; "palo duro"; "tezmolli"; "encina."

55. Quercus brandegei Goldman, Contr. U. S. Nat. Herb. **16**: 321. 1916.

Baja California; type locality, Rancho El Paraíso, near El Triunfo.

Moderately large evergreen tree with slender tomentulose twigs and minute round brown velvety buds; leaves small (scarcely 2 cm. wide and 3 to 6 cm. long), densely hoary beneath, elliptic-oblong, mucronately acute, rounded or acute at base, entire or with a few irregular low pungent teeth, the short petiole canescent; fruit rather long-peduncled; acorn conical, about 8 mm. in diameter and 15 mm. long, fully half included, the goblet-shaped cup with acute appressed scales.

56. Quercus tomentella Engelm. Trans. Acad. St. Louis **3**: 393. 1877.

Guadalupe Island, Baja California.

Moderate-sized evergreen tree with rather stout short-pilose twigs and tomentulose buds as much as 7 mm. in diameter and 12 mm. long; leaves moderate (4 to 7 cm. wide, 7 to 12 cm. long), coriaceous, granular on the midrib above, the whitened lower surface more or less persistently fleecy, elliptic-ovate, acute or subacuminate, subcordate, toothed, with short villous petiole; acorn ovoid or elongate, sometimes 30 mm. in diameter and 35 mm. long. scarcely ever half included, the thick half-round cup with its scales embedded in tomentum; wood hard, close-grained, yellowish brown, its specific gravity about 0.72.

57. Quercus palmeri Engelm. Trans. Acad. St. Louis **3**: 393. 1877.

Quercus dunnii Kellogg, Pacif. Rural Press, June 7, 1879.

Quercus chrysolepis palmeri Engelm. in S. Wats. Bot. Calif. **2**: 97. 1880.

Northern Baja California. Also in San Diego County, California, the type locality.

Evergreen shrub with slender, minutely scurfy twigs; leaves small (2 cm. wide, 3 cm. long), coriaceous, glabrate, rounded, acute, cordate, crisped or folded, typically coarsely and pungently dentate; acorn conic-oblong, 15 mm. in diameter, 25 to 30 mm. long, the subturbinate undulate-margined cup very fulvous-woolly.

58. Quercus emoryi[1] Torr. in Emory, Notes Mil. Recon. 151. 1848.

Quercus hastata Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 171. 1854.

Chihuahua and Sonora. Texas to Arizona; type from Texas.

Small deciduous tree with slender glabrescent red twigs and glossy brown glabrate buds sometimes 3 mm. in diameter and 8 mm. long; leaves small (1 to

[1] William H. Emory (1811–1887), was a member of the commission for establishing the boundary between the United States and Mexico. He was the author of "Notes of a military reconnoissance from Fort Leavenworth in Missouri to San Diego in California" (1848), and of the "Report of the United States and Mexican Boundary Commission" (1857).

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2 cm. wide, 3 to 6 cm. long), thick and hard, from minutely scurfy glabrescent, elliptic or oblong to ovate, mucronately acute, truncate at base or subcordate, short-petioled, characteristically repandly few-toothed; acorn narrowly ellipsoid, 8 mm. in diameter, 15 to 20 mm. long, one-third included, the rounded cup with blunt appressed scales; wood rather soft, strong but brittle, close-grained, dark brown, its specific gravity about 0.93.

The acorns are said to be of good quality as food.

59. **Quercus durifolia** Seemen, Bot. Jahrb. Engler 29: 95. 1900.

Durango; type locality, Durango.

Twigs slender, subglabrescent; buds glossy light brown, small; leaves (deciduous?) very small (1 cm. wide, 3 to 4 cm. long), firm, canescent beneath, short-lanceolate, mucronately acute, obliquely subtruncate at base, short-petioled, mostly with a few short teeth; acorn round-ovoid, under 10 mm. in diameter, fully half included, the rounded cup with blunt appressed scales.

60. **Quercus eduardi** Trel.

Quercus oligodonta Seemen, Bot. Jahrb. Engler 29: 96. 1900. Not *Q. oligodonta* Saporta, 1879.

Durango, Jalisco, and Tepic; type from Durango.

Small deciduous tree with slender glabrescent twigs and glossy, light brown, small buds; leaves small (2 to 4 cm. wide, 3 to 6 cm. long), firm, rather persistently stellate-scurfy beneath, oblong-elliptic, mucronately subacute, slightly cordate, with short glabrescent petiole, entire or with several aristate teeth; acorn ovoid or oblong, scarcely 8 mm. in diameter and 10 mm. long, half included, the turbinate cup with rounded appressed scales.

"Encina colorada"; the dark red wood valuable.

61. **Quercus devia** Goldman, Contr. U. S. Nat. Herb. 16: 322. 1916.

Baja California; type locality, between El Sauz and Chuparosa.

Moderately large evergreen tree, about 20 meters high, with slender glabrescent twigs and small, acutely ovoid, glabrescent buds; leaves rather small (1 to 3 cm. wide, 5 to 10 cm. long), often somewhat dingy-tomentose beneath, broadly lanceolate or oblong, very acute, subcordate, rather short-petioled, aristately toothed; acorn oblong, 8 mm. in diameter, 15 to 20 mm. long, the shallow cup with blunt appressed scales. "Encina negra."

62. **Quercus hypoleuca** Engelm. Trans. Acad. Sci. St. Louis 3: 384. 1877.

Chihuahua and Sonora. New Mexico (type locality, Santa Rita) and Arizona.

Shrub or small to moderately large subevergreen tree with rather slender gray-tomentose twigs and small red buds with ciliate scales; leaves rather small (2 to 3 cm. wide, 5 to 10 cm. long), rugose, revolute, blue-green above, densely pale-tomentulose beneath, lanceolate, aristately very acute, rounded at base, moderately petioled, typically entire; acorn narrowly conic-oblong, 8 mm. in diameter, 10 to 15 mm. long, scarcely one-third included, the turbinate cup with blunt, appressed, at first very tomentose scales; wood hard and strong, close-grained, dark brown, the specific gravity about 0.80.

63. **Quercus scytophylla** Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 180. 1854.

Oaxaca and Michoacán; type locality, Yalala to Yabochi, Oaxaca.

Twigs rather slender, glabrescent; buds small, glossy brown, glabrescent; leaves (deciduous?) large (7 to 8 cm. wide, 13 to 15 cm. long), rugose, densely creamy-tomentulose beneath, typically obovate and acute, obliquely acute or rounded at base, moderately petioled, characteristically with several short aristate teeth above; acorn ovoid, 10 mm. in diameter, 15 to 20 mm. long, the rounded or saucer-shaped cup with blunt appressed scales. "Encina" (Michoacán).

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64. Quercus omissa A. DC. in DC. Prodr. **16** [2]: 28. 1864.

Type locality, somewhere in the western Sierra Madre.

Twigs moderate, somewhat puberulent; buds elongate, dull brown, hairy at tip, scarcely 3 mm. in diameter and 6 mm. long; leaves (deciduous?) rather small (3 to 4 cm. wide, 5 to 6 cm. long), rugose, slightly revolute, creamy-tomentulose beneath, typically obovate, obtuse, cordate, short-petioled, aristately somewhat coarsely stiff-serrate above; acorn subglobose, 8 mm. in diameter, the rather deep cup with very blunt appressed scales.

65. Quercus pulchella Humb. & Bonpl. Pl. Aequin. **2**: 44. 1809.

Type locality, between Guanajuato and Santa Rosa.

Twigs slender, glabrescent; buds small, dark brown, glabrate; leaves deciduous, small (2 to 3 cm. wide, 4 to 6 cm. long), rugose, yellow-tomentulose beneath, oblong-obovate, obtuse, often subtruncately cordate, slender-petioled, aristately low-serrate; fruit annual (?), the rounded cup with glabrous blunt appressed scales.

66. Quercus floccosa Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 178. 1854.

Veracruz?; type from the Pico de Orizaba, at 2,600 to 3,200 meters.

Twigs moderate, at first rusty-scurfy; leaves (deciduous?) rather large (6 to 9 cm. wide, 9 to 16 cm. long), rugose, typically fleecy beneath, elliptic-obovate, aristately subacute, rounded at base, entire or with a few short teeth above, the moderate petiole fleecy; fruit unknown.

67. Quercus crassifolia Humb. & Bonpl. Pl. Aequin. **2**: 49. 1809.

Quercus spinulosa Mart. & Gal. Bull. Acad. Brux. **10** [2]: 218. 1843.

Guerrero to Veracruz and San Luis Potosí; type locality, Chilpancingo, Guerrero.

Rather large deciduous tree with somewhat stout, more or less scurfy twigs and glossy glabrate buds 3 mm. in diameter and 5 mm. long; leaves large (6 to 9 cm. wide, 12 to 14 cm. long), rugose, scurfy on the nerve above, tawny-fleecy beneath with the denudable surface granular, elliptic, obovate, or rounded, variously obtuse or subacuminate, cordate, short-petioled, aristate-undulate or stiffly low-toothed; fruit annual; acorn ellipsoid, 12 mm. in diameter, 15 to 20 mm. long, one-third or more included, the deep saucer-shaped cup with rounded appressed scales.

68. Quercus fulva Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 183. 1854.

Chihuahua, Durango, and Michoacán; the type from an unrecorded locality in the western Sierra Madre.

Twigs stout, densely tomentose; buds brownish, tomentose; leaves 4 to 9 cm. wide, 8 to 14 cm. long, densely tomentose beneath, petioled, aristately serrate. "Roble" (Durango).

69. Quercus stipularis Humb. & Bonpl. Pl. Aequin. **2**: 47. 1809.

Type locality, near Actopan (Veracruz?).

Twigs rather stout, fleecy; buds brownish, somewhat pubescent, 3 mm. in diameter, 5 mm. long; leaves deciduous, moderate (4 to 5 cm. wide, 7 to 10 cm. long), rugose, puberulent above on the midrib, rusty-fleecy beneath, elliptic-ovate to obovate, subacuminate, cordate, moderately petioled, aristately serrate; fruit annual; acorn ovoid, 12 mm. in diameter, 15 mm. long, scarcely one-third included, the rounded cup with blunt, rather loose scales.

70. Quercus chicamolensis Trel.

Quercus mollis Mart. & Gal. Bull. Acad. Brux. **10** [2]: 216. 1843. Not *Q. mollis* Raf. 1838.

Oaxaca; type locality, in the Mixteca Alta.

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Rather small (deciduous?) tree with moderate, at first densely tomentose twigs; leaves rather small (4 cm. wide, 5 to 6 cm. long), rugose, yellow-tomentose beneath, rather obovate and acute, cordate, short-petioled, entire but ciliately aristate above; acorn unknown, the rounded cup with blunt appressed scales.

71. Quercus dysophylla Benth. Pl. Hartw. 55. 1840.

San Luis Potosí, Veracruz, and Hidalgo; type locality, mountains near Huasca, Hidalgo.

Twigs moderate, subglabrescent; buds glossy red-brown, canescent, 3 mm. in diameter, 5 mm. long; leaves deciduous, rather small (2 to 3 cm. wide, 5 to 8 cm. long), revolute, subglabrescent above, rusty-tomentose beneath, oblong, ovate, or elliptic, subacute, cordate, moderately petioled, entire or less characteristically coarsely mucronate-toothed; acorn ovoid or elongate, 10 mm. in diameter, 15 to 18 mm. long, the shallow turbinate cup with obtuse appressed scales. "Manzanilla" (Hidalgo).

To be compared with no. 40, *Quercus diversifolia*, and with the following.

72. Quercus splendens Née, Anal. Cienc. Nat. 3: 275. 1801.

Type locality, Tixtla, Guerrero.

Small open-topped tree with moderate yellow-tomentose twigs; leaves (deciduous?) rather small (3 to 4 cm. wide, 8 cm. long), puberulent above, yellow-tomentose beneath, subelliptic, ranging to ovate or obovate, acute, rounded at base or subcordate, subsessile, irregularly and unequally toothed, but not aristate; fruit unknown.

Not known from recent collections.

73. Quercus aristata Hook. & Arn. Bot. Beechey Voy. 444. 1841.

Tepic and Sinaloa; type locality, between San Blas and Tepic.

Twigs rather slender, transiently fleecy; buds glabrate, small; leaves deciduous, moderate (3 to 4 cm. wide, 7 to 15 cm. long), glabrescent, somewhat crisped and narrowly rovolute, elliptic-oblong, aristately obtuse or subacute, rounded to cordate at base, moderately petioled, entire or undulate, sometimes aristate from the veins; fruit annual; acorn round-ovoid, 10 mm. in diameter, the deep rounded cup with blunt appressed scales.

74. Quercus uruapanensis Trel.

Quercus nitida Mart. & Gal. Bull. Acad. Brux. 10[2]: 210. 1843. Not *Q. nitida* Raf. 1838.

Michoacán and Oaxaca (?); type locality, Uruapan, Michoacán.

Thick-trunked, moderately large, deciduous tree with rather slender, glabrous, dark red twigs and small, puberulent, glossy, deep brown buds; leaves rather large (4 to 7 cm. wide, 9 to 16 cm. long), glabrous, or with axillary tufts beneath, subelliptic, acuminate, acute to truncate at base, moderately petioled, entire or exceptionally somewhat aristate-toothed above; acorn ovoid, 12 mm. in diameter, 20 mm. long, one-third included, the rounded cup with blunt appressed scales. "Encina colorada."

Yielding excellent timber.

75. Quercus rysophylla Weatherby, Proc. Amer. Acad. 45: 423. 1910.

Nuevo León; type locality, in the Sierra Madre above Monterrey.

Rather small tree with stout glabrate twigs and glabrescent, glossy brown, acute buds 3 mm. in diameter and 6 mm. long; leaves supersistent, large (4 to 7 cm. wide, 14 to 20 cm. long), rugose and veiny, revolute, glabrous, lanceolate, aristately long-acute, auriculate or deeply cordate at base, short-petioled, undulate; acorn unknown, the young cup with obtuse appressed golden scales.

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76. Quercus nectandraefolia Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 175. 1854.

Veracruz; type locality, Totutla.

Twigs rather slender, dingy-tomentose; buds brown, glabrescent, small; leaves (deciduous?) moderate (3 to 5 cm. wide, 9 to 12 cm. long), revolute, glabrous, somewhat paler and granular beneath, elliptic, obtuse, acute to subcordate at base, subsessile, crisped but entire; fruit annual; acorn ovoid, 20 mm. in diameter, 25 mm. long, thick-walled, half included, the rounded cup with blunt thickened appressed scales.

77. Quercus lingvaefolia Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 180. 1854.

Oaxaca; type locality, Cuesta de Lachopa.

Twigs moderate, glabrescent; leaves (deciduous ?) moderate (3 to 4 cm. wide, 6 to 11 cm. long), slightly revolute, somewhat floccose or glabrate, elliptic, obtuse or acute, cordate, short-petioled, entire; acorn ovoid, 10 mm. in diameter, 15 mm. long, the saucer-shaped cup with blunt appressed scales.

78. Quercus perseaefolia Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 188. 1854.

Veracruz; type locality, Hacienda de Jovo.

Twigs rather slender, glabrescent; buds small, glabrate; leaves deciduous, moderate (3 to 5 cm. wide, 6 to 12 cm. long), slightly revolute, glabrate, oblanceolate-elliptic, obtuse at both ends, very short-petioled, entire; fruit annual; acorn oblong, 10 mm. in diameter, 15 mm. long, one-third included, the turbinate cup with blunt appressed scales.

79. Quercus pubinervis Mart. & Gal. Bull. Acad. Brux. **10** [2]: 211. 1843.

Veracruz; type locality, about Huatusco.

Rather large deciduous tree with slender tomentose twigs and small red-brown glabrate buds; leaves moderate (4 to 5 cm. wide, 8 to 12 cm. long), somewhat revolute, the midrib puberulent above and the lower surface somewhat persistently fleecy, lance-ovate to elliptic-oblanceolate, rounded at both ends, very short-petioled, entire or low-undulate; fruit annual; acorn oblong, 10 mm. in diameter, 15 mm. long, one-third included, the turbinate cup with blunt appressed scales.

80. Quercus oajacana Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 178. 1854.

Quercus salicifolia oajacana Wenzig, Jahrb. Bot. Gart. Berlin **3**: 207. 1884.

Oaxaca; type locality, between Tanetze and Talea.

Twigs moderate, yellow-scurfy; buds red-brown, somewhat hairy, small; leaves evergreen, moderate (3 to 4 cm. wide, 8 to 10 cm. long), with puberulent midrib above, loosely stellate beneath, lance-elliptic to subovate, acute, rounded at base, short-petioled, entire or somewhat undulate; fruit annual; acorn ovoid, 12 mm. in diameter, 15 mm. long, the shallow cup with blunt appressed scales.

81. Quercus totulensis A. DC. in DC. Prodr. **16** [2]: 62. 1864.

Veracruz; type locality, Totutla.

Twigs slender, quickly glabrous; buds glabrous, glossy light brown, 2 mm. in diameter, 5 mm. long; leaves deciduous, rather small (2 cm. wide, 6 to 8 cm. long), paler and sometimes with axillary tufts beneath, oblong, rounded at both ends or a little narrowed below, slender-petioled, entire; acorn rounded, fully half included, the rounded cup with rather acute appressed scales.

82. Quercus salicifolia Née, Anal. Cienc. Nat. **3**: 265. 1801.

Quercus mexicana glabrata Seem. Bot. Voy. Herald 332. 1852–7.

Quercus castanea glabrata A. DC. in DC. Prodr. **16** [2]: 72. 1864.

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Guerrero; type locality apparently Acapulco.

Twigs slender, glabrous; buds small; leaves deciduous, moderate (2 to 4 cm. wide, 10 to 15 cm. long), glabrous, lanceolate, aristately long-acute, typically rounded at base, short-petioled, entire; fruit annual (?); acorn subglobose, 12 mm. in diameter, half included, the subturbinate cup with appressed scales. "Encina saucillo" (Durango).

83. Quercus ghiesbreghtii Mart. & Gal. Bull. Acad. Brux. 10[2]: 212. 1843.

Veracruz; type locality, on Mount Orizaba, at 3,300 meters.

Moderate-sized evergreen tree with rather slender, at first dingy-tomentose twigs and small, glabrate, glossy brown buds; leaves moderate (3 cm. wide, 8 to 10 cm. long), somewhat pubescent on the veins beneath, lanceolate, long-acute, very round-based, moderately petioled, entire; fruit annual; acorn short-ovoid, 10 mm. in diameter, 12 mm. long, the turbinately saucer-shaped cup with blunt appressed scales.

84. Quercus tlapuxahuensis A. DC. in DC. Prodr. 16[2]: 29. 1864.

Quercus salicifolia tlapuxahuensis Wenzig, Jahrb. Bot. Gart. Berlin 3: 207. 1884.

Michoacán; type locality, Tlalpuxahua.

Twigs moderate, glabrous; buds small, dull brown, loosely hairy above; leaves (deciduous?) moderate (3 cm. wide, 7 to 10 cm. long), glabrous or the midrib slightly puberulent above and the lower surface with axillary tufts, lanceolate, aristately acute, rounded at base, slender-petioled, entire; fruit annual; acorn short-ovoid, 12 cm. in diameter, 15 mm. long, fully half included, the rounded cup with obtuse, appressed, somewhat revolutely thickened scales.

85. Quercus lanceolata Humb. & Bonpl. Pl. Aequin. 2: 34. 1809.

Hidalgo; type locality, between Morán and Santa Rosa.

Rather small (subevergreen?) tree with slender, transiently scurfy twigs and small glabrescent brown buds; leaves rather small (3 cm. wide, 7 to 10 cm. long), glabrous, or slightly scurfy above or fleecy in the axils beneath, lanceolate, acute at both ends or rounded at base, slender-petioled, entire or occasionally with a few low aristate teeth; acorn ovoid, 10 mm. in diameter, 12 mm. long, scarcely half included, the rounded cup with glabrous blunt appressed scales somewhat thickened toward the base.

86. Quercus laurina Humb. & Bonpl. Pl. Aequin. 2: 32. 1809.

Hidalgo; type locality, Cerro de las Navajas, near Morán.

Very like the preceding, the deciduous leaves rather more broadly oblanceolate, the fruit apparently annual, and the cupule scales less commonly thickened.

87. Quercus major (A. DC.) Trel.

Quercus nitens major A DC. in DC. Prodr. 16[2]: 69. 1864.

Quercus laurina major Wenzig, Jahrb. Bot. Gart. Berlin 3: 205. 1884.

Veracruz; type locality, Alpatlahua.

Twigs rather slender, glabrate; buds small, acute, glabrescent; leaves deciduous, moderate (2 to 4 cm. wide, 6 to 9 cm. long), glabrous, or puberulent along the midrib above and with axillary tufts beneath, lanceolate to oblanceolate-obovate, acute at both ends or rounded at base, slender-petioled, characteristically serrately incised with aristate teeth; acorn ovoid, 10 mm. in diameter, 15 mm. long, half included, the rounded cup with blunt appressed scales.

88. Quercus barbinervis Benth. Pl. Hartw. 56. 1840.

Quercus laurina barbinervis Wenzig, Jahrb. Bot. Gart. Berlin 3: 205. 1884.

Hidalgo; type locality, Real del Monte.

Twigs rather slender, sparsely tomentose; buds small, glabrescent; leaves deciduous, small (scarcely 3 cm. wide and 5 cm. long) or on shoots larger

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(as much as 5 cm. wide and 13 cm. long), glabrate, or with fleecy axils beneath, slightly revolute, elliptic-obovate, acute, mostly rounded at base, the moderate petiole pubescent, coarsely few-toothed above; fruit annual (?); acorn ovoid, 10 to 12 mm. in diameter, 15 to 18 mm. long, half included, the rounded cup with blunt appressed scales.

89. Quercus affinis Scheidw. Hort. Belg. 4: 321. 1837.

Type locality, between Regla and Istula, Hidalgo.

Twigs slender, at first scurfy; buds small, glabrous, glossy brown; leaves evergreen, small (2 cm. wide, 7 to 9 cm. long), glossy, glabrous, oblong-lanceolate, acute at both ends, moderately petioled, sharply setaceous-serrate with short teeth; fruit biennial (?); acorn unknown, the immature cup with rather acute appressed scales.

90. Quercus ocoteaefolia Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 176. 1854.

Quercus laurina ocoteaefolia Wenzig, Jahrb. Bot. Gart. Berlin 3: 205. 1884.

Oaxaca and Puebla; also in Michoacán (?); type locality, Talea and Laguna, Oaxaca.

Small deciduous tree with slender glabrescent twigs and small, glossy brown, glabrescent buds; leaves moderate (3 cm. wide, 8 to 10 cm. long), glossy, glabrous, or with axillary tufts beneath, lanceolate, acute at both ends or somewhat rounded at base, shortly slender-petioled, entire or less commonly with a few teeth; acorn ovoid, 8 mm. in diameter, 10 mm. long, half included, the rounded cup with blunt appressed scales.

91. Quercus depressa Humb. & Bonpl. Pl. Aequin. 2: 50. 1809.

Hidalgo; type locality, El Jacal, Morán.

Low evergreen shrub with slender stellate-scurfy twigs and small, dull brown, glabrate buds; leaves small (1 to 2 cm. wide, 3 to 4 cm. long), rather thick, slightly revolute, glabrate or the midrib puberulent above, lance-elliptic, acute or acuminate, rounded at base, short-petioled. usually with a few coarse teeth; acorn ovoid, acute, 8 mm. in diameter, 12 mm. long, half included, the rounded cup with blunt appressed scales.

92. Quercus orizabae Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 189. 1854.

Veracruz (?); type locality, Pico de Orizaba, at 2,600 to 3,300 meters, with *Q. floccosa.*

Twigs moderate, at first rusty-fleecy; buds small, red-brown, somewhat hairy; leaves (deciduous?) rather large (3 to 7 cm. wide, 8 to 14 cm. long), glabrescent above, somewhat fleecy beneath, slightly revolute, elliptic-ovate, acute, obliquely rounded at base, slender-petioled, entire or artistately about 3-toothed at end; fruit unknown.

93. Quercus sideroxyla Humb. & Bonpl. Pl. Aequin. 2: 39. 1809.

Guanajuato; type locality, Santa Rosa.

Large evergreen tree with slender lanose twigs and small brown glabrescent buds; leaves small (2 cm. wide, 4 to 6 cm. long), the lower surface sometimes hairy-tufted, broadly oblong, subacute, cordate at base, short-petioled, sharply and rather incisely toothed; acorn ovoid, 10 mm. in diameter, 12 mm. long, half included, the rounded cup with blunt appressed scales.

94. Quercus chrysophylla Humb. & Bonpl. Pl. Aequin. 2: 42. 1809.

Hidalgo; type locality, between Pachuca and Morán.

Moderate-sized deciduous tree with slender glabrescent twigs and small reddish glabrous buds; leaves small (2 cm. wide, 4 to 6 cm. long), from scurfy glabrescent, oblanceolate-oblong, with straight margin, subacute, rounded at base, moderately petioled, setaceously several-toothed at end; fruit unknown.

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95. Quercus tridens Humb. & Bonpl. Pl. Aequin. **2**: 35. *pl.* 82. 1809.

Hidalgo; type locality, Morán.

Very like the preceding, the short-petioled leaves entire or aristately about 3-toothed at the end; mature foliage characters, even, unknown for both species.

96. Quercus mexicana Humb. & Bonpl. Pl. Aequin. **2**: 35. 1809.

Quercus castanea mexicana A. DC. in DC. Prodr. **16** [2]: 72. 1864.

Quercus castanea integra Oerst. Bidr. Kundsk. Egefam. 362. 1871.

Veracruz and Guanajuato; type locality, Santa Rosa, Guanajuato.

Small or moderately large deciduous tree with slender glabrescent twigs and small brown glabrescent buds; leaves small or narrow (2 to 5 cm. wide, 10 cm. long), rugose, revolute, the midrib puberulent above and the granular lower surface detachably tomentose, elliptic-oblong, subacute, rounded at base or slightly cordate, short-petioled, entire; acorn ovoid, 10 mm. in diameter, 12 mm. long, half included, the thick-stalked rounded cup with glabrate blunt appressed scales, these sometimes thickened at base or with outcurved margin.

With still narrower leaves (1.5 cm. wide and 7 cm. long) it is *Q. crassipes angustifolia* Humb. & Bonpl. (op. cit. 37. 1809); and a form of this with crowded leaves is *Q. confertifolia* Humb. & Bonpl. (op. cit. 53. 1809).

97. Quercus crassipes Humb. & Bonpl. Pl. Aequin. **2**: 37. 1809.

Mexico, Guanajuato, and Hidalgo; type locality, Santa Rosa, Guanajuato.

Similar to the preceding, but the turbinate cup inrolled at the margin.

98. Quercus lanigera Mart. & Gal. Bull. Acad. Brux. **10** [2]: 215. 1843.

Oaxaca; type locality in the Mixteca Alta.

Twigs slender, glabrescent; buds small, brown, glabrescent; leaves deciduous, small (2 to 3 cm. wide, 5 to 6 cm. long), detachably fleecy beneath, elliptic-oblong, aristately obtuse or acute, rounded at base, moderately petioled, entire or with a few awned teeth above; fruit annual; acorn subglobose, scarcely 10 mm. in diameter, the somewhat turbinate cup with blunt appressed scales.

99. Quercus castanea Née, Anal. Cienc. Nat. **3**: 276. 1801.

Quercus mucronata Willd. Sp. Pl. **4**: 436. 1805.

Hidalgo; type locality, between Ixmiquilpan and Zimapán and Acámbaro.

Small (deciduous?) tree with rather slender glabrescent twigs and glabrous brown buds 2 mm. in diameter and 4 mm. long; leaves rather small (3 to 4 cm. wide, 7 to 9 cm. long), rugulose, minutely stellate beneath, lance-oblong, aristately acute, rounded at base or subcordate, short-petioled, typically aristately low-serrate above; fruit annual; acorn round-ovoid, 8 mm. in diameter, 10 mm. long, the rounded cup with blunt appressed scales.

A form with slightly obovate-elliptic, typically entire leaves, from the same region, is *Q. elliptica* Née (op. cit. 278. 1801).

100. Quercus rugulosa Mart. & Gal. Bull. Acad. Brux. **10** [2]: 209. 1843.

Hidalgo; type locality, San Pedro y San Pablo, near Real del Monte.

Moderate-sized deciduous tree with rather slender glabrescent twigs and small, brown, at first fleecy buds; leaves rather small (2 to 4 cm. wide, 6 to 9 cm. long), minutely revolute, reticulately venulose, somewhat stellate, especially on the granular lower surface, elliptic-oblong, mucronately obtuse or subacute, rounded at base or somewhat cordate, moderately petioled, entire; acorn short, the somewhat turbinate small cup with blunt thin scales.

101. Quercus grandis Liebm. Overs. Dansk. Vid. Selsk. Forh. 1854: 183. 1854.

Oaxaca. Northern Guatemala, the type locality.

Large deciduous tree with rather slender glabrate twigs and small brown glabrescent buds; leaves large (5 to 10 cm. wide, 14 to 23 cm. long), glabrous,

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somewhat paler beneath, oblanceolate, acute, commonly narrowed at base, slender-petioled, with rather distant aristate teeth; acorn depressed, 20 to 25 mm. in diameter, two-thirds or more included, the urceolate, slightly umbonate cup with thin blunt scales somewhat outcurved at margin.

102. Quercus cortesii Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 175. 1854.

Veracruz; type locality, between Hacienda de Jovo and Huitamalco.

Twigs slender, glabrous; buds small, straw-colored, glabrescent; leaves (deciduous?) moderate (3 cm. wide, 12 cm. long), glabrous, or with axillary tufts beneath, narrowly lanceolate, acute at both ends, moderately petioled, rather distantly aristate-serrate; fruit unknown.

103. Quercus huitamalcana Trel.

Quercus serra Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 174. 1854. Not *Q. serra* Unger, 1845.

Veracruz and Puebla; type locality, between Huitamalco and Teziutlán, altitude 2,000 meters.

Twigs rather slender, glabrate; buds light brown, glabrescent, 2 mm. in diameter, 3 to 4 mm. long; leaves (deciduous?) large (4 to 7 cm. wide, 16 to 20 cm. long), glabrous and glossy, crisped, lanceolate, the base various, moderately petioled, coarsely deltoid-serrate; fruit unknown.

104. Quercus chiapasensis Trel. Proc. Amer. Phil. Soc. **54**: 9. 1915.

Chiapas; type locality, Finca Irlanda.

Large evergreen tree with moderate glabrescent twigs and hairy buds; leaves large (4 to 8 cm. wide, 12 to 15 cm. long), glabrous, lanceolate, long-acute, the base various, the petiole moderate or long, coarsely serrate or incised with aristate teeth; acorn broadly ovoid, 30 to 40 mm. in diameter, the large saucer-shaped cup with thickened appressed scales.

Polymorphic in foliage details.

105. Quercus skinneri Benth. Pl. Hartw. 90. 1842.

Guatemala (type locality, in the mountains about Quezaltenango); possibly also in Chiapas.

Large (deciduous?) tree, similar to the preceding, but the equally long round-based leaves ovate, with longer slender petiole, and fruit even larger.

106. Quercus sartorii Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 177. 1854.

Veracruz; type locality, Totutla.

Deciduous tree with rather slender glabrescent twigs and brown glabrescent buds 3 mm. in diameter and 6 mm. long; leaves moderate (3 to 5 cm. wide, 9 to 13 cm. long), glabrescent, or with axillary tufts beneath, lance-elliptic, acute, typically rounded at base, slender and often long-petioled, entire with aristate veins or very low-serrate; fruit annual; acorn round-ovoid, 10 mm. in diameter, 12 mm. long, the sometimes turbinate cup with obtuse appressed scales.

107. Quercus furfuracea Liebm. Overs. Dansk. Vid. Selsk. Forh. **1854**: 189. 1854.

Oaxaca; type locality, Chinantla.

Twigs rather slender, scurfy or glabrescent; buds small, light brown, glabrescent; leaves deciduous, moderate (3 to 5 cm. wide, 8 to 12 cm. long), gray-stellate and tufted beneath, ovate to lanceolate, acute, mostly rounded at base, moderately petioled, entire or aristately low-crenate-serrate; acorn round-ovoid, 8 mm. in diameter, 10 mm. long, the somewhat turbinate deep cup with blunt appressed scales.

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108. Quercus grahami[1] Benth. Pl. Hartw. 57. 1840.

Oaxaca; type locality not recorded.

Rather large deciduous tree with slender glabrous twigs and small, light brown, glabrescent buds; leaves moderate (2 to 4 cm. wide, 7 to 12 cm. long), glabrous, or sparsely scurfy and tufted in the axils beneath, very venulose, lanceolate, rather taper-pointed, typically rounded at base, slender-petioled, setaceously serrate or incised; acorn ovoid, 12 mm. in diameter, 15 to 20 mm. long, half included, the rounded cup with blunt appressed scales.

109. Quercus acutifolia Née, Anal. Cienc. Nat. 3: 267. 1801.

Type locality above the Río Mescala, on the road from Acapulco to the City of Mexico.

Rather small evergreen tree with rather slender glabrate twigs and brown glabrate buds 3 mm. in diameter and 6 mm. long; leaves large (5 to 7 cm. wide, 15 to 20 cm. long), glabrous, or the midrib puberulent above and the axils tufted beneath, lance-ovate, acute or attenuate, the base mostly rounded, rather long-petioled, aristately serrate or almost lobed, with rounded sinuses; fruit unknown. "Aguatle."

110. Quercus xalapensis Humb. & Bonpl. Pl. Aequin. 2: 24. 1809.

Veracruz; type locality, Jalapa.

Rather large deciduous tree with moderate glabrate twigs and brown glabrate acute buds 2 to 3 mm. in diameter and 5 mm. long; leaves large (4 to 8 cm. wide, 10 to 15 cm. long), glabrous, or with some axillary tufts beneath, broadly or ovately lanceolate, acute, typically acute at base or decurrent on the slender petiole, setaceously serrate with the margin little indented; acorn round-ovoid, 18 mm. in diameter, 20 mm. long, half included, the rounded cup with blunt, rather loose scales. "Roble de duela," "encina roble" (Veracruz, *Ramírez*).

111. Quercus calophylla Cham. & Schlecht. Linnaea 5: 79. 1830.

Veracruz; type locality, Jalapa.

Large (deciduous?) tree with moderate fleecy or glabrate twigs and dull brown glabrescent buds as much as 12 mm. long; leaves large (4 to 7 cm. wide, 11 to 13 cm. long), densely creamy-tomentulose beneath, ovate to obovate or elliptic, acute or acuminate, rounded or obliquely truncate at base, moderately petioled, somewhat bristly-serrate at the end; acorn ovoid, 18 mm. in diameter, 20 to 25 mm. long, one-third included, the half-round cup with blunt, rather loose scales.

With long-acuminate low-denticulate leaves as much as 12 cm. wide and 22 cm. long it is *Q. acuminata* Mart. & Gal. (Bull. Acad. Brux. 10[2]: 217. 1843). With blunt-pointed, rather deeply serrate and acute-based leaves 5 cm. wide and 13 cm. long, it is *Q intermedia* Mart. & Gal. (op. cit. 223. 1843). A form with acute, sharply toothed leaves 5 cm. wide and 10 cm. long, or exceptionally 11 cm. wide and 18 cm. long. *Q. alamo* Benth. (Pl. Hartw. 55. 1842), is called "álamo" because of its soft poplar-like wood.

112. Quercus candicans Née, Anal. Cienc. Nat. 3: 277. 1801.

Type locality, Tixtla, Guerrero.

Moderate-sized deciduous tree with moderate, rather persistently tomentose twigs and ovoid glabrate buds 3 mm. in diameter and 5 to 7 mm. long; leaves typically large (10 to 15 cm. wide, 15 to 25 cm. long), densely creamy-tomentu-

[1] G. J. Graham collected a series of about 400 specimens of plants about the City of Mexico, Tlalpuxahua, and Real del Monte. These were reported upon by Bentham in his "Plantae Hartwegianae."

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lose beneath, elliptic-obovate, subacute, variously narrowed or rounded or truncate at base, moderately petioled, aristately repand to rather deeply lobed; fruit unknown. "Encina de asta."

Sapwood red, the heart dark, with still darker stripes.

23. ULMACEAE. Elm Family.

Trees or shrubs; leaves deciduous or persistent, alternate, entire or dentate, usually rough; flowers small, greenish, perfect or unisexual; fruit 1-seeded.

Fruit dry.
  Fruit not winged ..... 1. CHAETOPTELEA.
  Fruit winged ..... 2. ULMUS.
Fruit a drupe.
  Leaves opposite ..... 3. LOZANELLA.
  Leaves alternate.
    Pistillate flowers in lax many-flowered cymes; plants unarmed. 4. TREMA.
    Pistillate flowers solitary or few; plants often armed with spines. 5. CELTIS.

1. **CHAETOPTELEA** Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1850: 54. 1850.

1. **Chaetoptelea mexicana** Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1850: 76. 1850.

Ulmus mexicana Planch. in DC. Prodr. 17: 156. 1873.

Veracruz, the type from Mirador; reported from Oaxaca. Costa Rica and Panama.

Large tree, 15 to 40 meters high, with open crown, the branches ascending; bark gray, somewhat scaly; leaves deciduous, oblong-ovate, acuminate, serrate; flowers yellow; wood hard, heavy, strong, very tough, rather fine-grained, light or dark brown, sometimes with darker lines. "Olmo" (Oaxaca, Veracruz); "papalote," "cempoalehuatl" (Veracruz); "ira" (Costa Rica); "ceniza," "cenizo" (Panama).

The wood is used in Mexico for lumber. The bark is astringent and is used for treating coughs.

Planchon[1] has stated that this plant differs in no way from *Ulmus*. All the species of the latter genus, however, have a broadly winged fruit, while in *Chaetoptelea* there is no vestige of a wing, and this is a probably a sufficient basis for the maintenance of Liebmann's genus.

2. ULMUS L. Sp. Pl. 225. 1753.

Sessé and Mociño reported[2] *Ulmus americana* from Mexico. The plant so named (if the report is based on an actual plant) probably belongs to some other genus.

The members of this genus (the elms) are perhaps the finest shade trees for temperate regions, although they are of slow growth. The wood of most species is extremely tough.

1. **Ulmus crassifolia** Nutt. Trans. Amer. Phil. Soc. 5: 169. 1837.

No Mexican specimens seen by the writer, but the species is common along the Rio Grande in Texas, and doubtless occurs in Nuevo León and Tamaulipas. Texas to Mississippi.

Tree, sometimes 30 meters high, with a trunk diameter of 1 meter, the branches drooping; bark thick, brown, deeply fissured; leaves oblong or ovate,

[1] In DC. Prodr. 17: 156. 1873. [2] Pl. Hisp. 45. 1887.

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5 cm. long or smaller, short-petiolate, finely serrate; flowers small, clustered, appearing in autumn; fruit 8 to 10 mm. long, hairy; wood reddish brown, rather weak, its specific gravity about 0.70.

The wood is used locally for furniture and wheel hubs.

3. LOZANELLA Greenm. Proc. Amer. Acad. 41: 236. 1905.

The following is the only species of the genus, which was named in honor of Señor Don Filemón L. Lozano, who assisted Pringle in his Mexican collections.

1. **Lozanella trematoides** Greenm. Proc. Amer. Acad. 31: 236. 1905.

Known only from the type locality, "Honey Station," near Trinidad, Hidalgo.

Shrub or small tree, 2 to 6 meters high; leaves slender-petioled, ovate, 5 to 9 cm. long, acuminate, serrate, 3-nerved, thinly hairy beneath; flowers dioecious, small and green, the pistillate in axillary cymes; perianth 5 or 6-parted; fruit a sessile ovoid greenish drupe.

4. TREMA Lour. Fl. Cochinch. 562. 1790.

1. **Trema micrantha** (L.) Blume, Ann. Mus. Bot. Lugd. Bat. 2: 58. 1853.

Rhamnus micranthus L. Syst. Nat. ed. 10. 2: 937. 1759.

Celtis canescens H. B. K. Nov. Gen. & Sp. 2: 28. 1817.

Celtis schiedeana Schlecht. Linnaea 7: 140. 1832.

Sponia micrantha Decaisne, Nouv. Ann. Mus. Paris 3: 498. 1834.

Sinaloa to Veracruz and southward. Florida, West Indies, Central America, and tropical South America.

Shrub or small tree, 2 to 6 meters high or in some parts of its range still larger, the trunk occasionally 10 to 15 cm. in diameter; leaves ovate, finely serrate, 3-nerved, acute or acuminate, 5 to 12 cm. long, their pubescence variable in amount; flowers very small, greenish white, cymose; fruit small (about 1.5 mm. in diameter), globose, green or reddish; wood light, soft, close-grained, light brown. "Ixpepe" (Veracruz); "equipal" (Michoacán); "yaco de cuero" (Oaxaca, *Reko*); "jucó," "capulín," "vara blanca" (Costa Rica); "capulí" (Guatemala); "masaquila" (Venezuela); "memisa" (Santo Domingo); "palo de cabra," "guacimilla" (Porto Rico).

The bark contains very strong fiber. The species of this genus seem to be of little economic importance. *T. commersonii* Blume, of Madagascar, is highly esteemed for medicinal purposes by the natives, and stomachic, astringent, febrifuge, diuretic, and antisyphilitic properties are attributed to it.

5. CELTIS L. Sp. Pl. 1043. 1753.

Large or small trees or shrubs, sometimes scandent, armed or unarmed; leaves deciduous or somewhat persistent, entire or dentate, often unequal at base; flowers small, the pistillate usually solitary and long-pedicellate; fruit globose, with thin flesh and a large seed.

The fruit of all the species is sweet and edible, especially in the spineless species (hackberries or sugarberries), but the pulp is very scant. The Indians of some parts of the United States seem to have been very fond of it. They pounded the fruit fine, seeds and all, and ate it with fat or mixed with parched corn.[1]

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[1] See M. R. Gilmore, Uses of plants by the Indians of the Missouri River region. Ann. Rept. Bur. Amer. Ethnol. 33: 45–154. *pl. 1–30.* 1919.

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Plants armed with spines.
  Leaves mostly 3 to 5.5 cm. wide, with numerous small teeth, or sometimes entire; fruit short-pilose ..... 1. C. iguanaea.
  Leaves mostly 1 to 2 cm. wide, with few coarse teeth; fruit glabrous or nearly so ..... 2. C. pallida.
Plants unarmed.
  Leaves pinnately nerved, not at all 3-nerved, the lateral nerves very numerous ..... 3. C. monoica.
  Leaves conspicuously 3-nerved at the base, the the lateral nerves few, distant.
    Leaves finely pilose beneath, usually dentate near the apex. Leaves usually scabrous on the supper surface ..... 4. C. caudata.
    Leaves glabrate or sparsely puberulent beneath, entire.
      Leaves very thick, scabrous on the upper surface and grayish green, the venation very prominently reticulate beneath ..... 5. C. reticulata.
      Leaves thin, smooth on the upper surface and deep green, the venation not very prominently reticulate beneath ..... 6. C. mississippiensis.

1. **Celtis iguanaea** (Jacq.) Sarg. Silv. N. Amer. 7: 64. 1895.
Rhamnus iguanaeus Jacq. Enum. Pl. Carib. 16. 1760.
Mertensia laevigata H. B. K. Nov. Gen. & Sp. 2: 31. 1817.
Momisia ehrenbergiana Klotzsch, Linnaea 20: 538. 1847.
Celtis anfractuosa Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 338. 1851.
Celtis platycaulis Greenm. Proc. Amer. Acad. 39: 78. 1903.
Momisia iguanaea Rose & Standl. Contr. U. S. Nat. Herb. 16: 8. 1912.

Chihuahua to Baja California and southward. Central America, West Indies, and South America; southern Florida and western Texas.

Shrub or small tree, 3 to 12 meters high, the trunk often 25 to 30 cm. in diameter, the branches armed with stout, usually recurved spines, long and spreading or clambering; branchlets often compressed; leaves ovate or oval; flowers greenish yellow; fruit 8 to 12 mm. long, yellow, somewhat angled. "Granjeno" (Veracruz and elsewhere); "garabato blanco" (Sinaloa); "uña de gato," "zarza" (Cuba); "cagalera comestible'" (Nicaragua); "gallito" (Santo Domingo).

The leaves are very variable in shape and toothing, but their variations seem to offer no basis for specific segregation. The leaves of this and the following species are conspicuously domatiate beneath—furnished with cuplike shelters (for parasites?) in the axils of the veins. The fruit is edible. The specific name is derived from the fact that the fruit is eaten by iguanas, the common and characteristic lizards of the tropics.

2. **Celtis pallida** Torr. U. S. & Mex. Bound. Bot. 203. 1859.
Momisia pallida Planch. in DC. Prodr. 17: 191. 1873.

Chihuahua to Baja California and Oaxaca. Arizona to western Texas (type locality).

Densely branched spiny shrub, 1 to 6 meters high, the branches often long and recurved; leaves oval to oblong, obtuse or acutish; cymes few-flowered; fruit 5 to 8 mm. long, yellow, orange, or red. "Granjeno" (Chihuahua, Durango, Nuevo León, Texas; often written "grangeno"); "granjeno huasteco" (Tamaulipas); "capul" (Durango, Texas); "garabato" (Sinaloa).

This shrub often forms dense impenetrable thickets of considerable extent. The wood is good for fuel and fence posts. The fruit is edible, but somewhat astringent. The flowers are said to furnish a good quality of honey.

The pubescence of the branchlets is usually appressed but sometimes spreading. The leaves are variable in outline, usually with a few large teeth, but

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sometimes entire. The species has been reported from Mexico as *Celtis tala* Gill., a plant of South America. This is presumably the plant described from Mexico by Sessé and Mociño[1] as *Rhamnus grangenos*, although it is doubtful whether that name is not referable rather to *Celtis iguanaea*.

3. Celtis monoica Hemsl. Biol. Centr. Amer. Bot. 3: 139. *pl.* 77. 1883.

Veracruz and Oaxaca; María Madre Island; type from Tantoyuca, Veracruz.

Leaves oblong-ovate, 6 to 9 cm. long, acuminate, lustrous, shallowly serrate, strigose beneath. "Palo de águila" (Oaxaca).

Very different in appearance from the other species of the genus, especially because of the pinnate-veined leaves. The fruit bears scattered sharp tubercles.

4. Celtis caudata Planch. Ann. Sci. Nat. III. 10: 294. 1848.

Celtis littoralis Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 337. 1851.

Querétaro and Hidalgo to Michoacán and Oaxaca; type from Zimapán, Hidalgo.

Tree, usually of small size; leaves ovate, asymmetric, long-acuminate, at least part of them usually dentate, rarely all entire.

This is doubtless the species reported from Cuernavaca by Sessé and Mociño[2] as *Celtis occidentalis* L.

5. Celtis reticulata Torr. Ann. Lyc. N. Y. 2: 247. 1824.

Coahuila to Baja California. Texas to Colorado and Arizona; type from the Rocky Mountains.

Small or large tree, sometimes 15 meters high, with a trunk 50 to 60 cm. in diameter, but in arid places frequently only a shrub 3 meters high, the crown dense, broad, the branches often very crooked; bark white or gray, smooth on young trees, very rough in age; leaves often rounded-ovate, obtuse or acute, 3 to 7 cm. long; fruit red or orange, about 8 mm. in diameter; wood with a specific gravity of about 0.72. "Palo blanco" (Durango, Tamaulipas, Texas); "palo mulato" (Durango); "acibuche" (Chihuahua); "cumbro" (Sinaloa); "palo duro" (New Mexico).

The tree is usually too small and crooked to be of economic importance, but the wood is used for posts and for axe and hoe handles, and for other similar purposes. The leaves are frequently covered with curious insect galls.

6. Celtis mississippiensis Bosc, Dict. Agr. 10: 541. 1847.

Celtis berlandieri Klotzsch, Linnaea 20: 541. 1847.

Coahuila to Tamaulipas and San Luis Potosí. Northeastward to Illinois and Florida.

Tree, in some parts of its range 39 meters high, with a trunk 1 meter in diameter; bark white and smooth on young trees, gray and rough in age, with corky projections; leaves ovate, 5 to 12 cm. long, acute to long-acuminate; fruit orange or red; wood yellow, soft, its specific gravity about 0.50. "Palo blanco" (Coahuila, Tamaulipas).

Often planted or left as a shade tree about dwellings; wood used in Mexico for carts and other objects, and in the United States, occasionally, for furniture and flooring; fruit edible, as in the other species, the pulp sweet but very scant.

The Mexican specimens always have entire leaves. They do not seem specifically separable from the eastern form, although the leaves are often broader.

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[1] Pl. Nov. Hisp. 38. 1887. [2] Pl. Nov. Hisp. 174. 1887.

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24. MORACEAE. Mulberry Family.

Usually trees, with milky sap; leaves alternate, entire, dentate, or lobate, the stipules deciduous; flowers very small, monoecious or dioecious.

The only other Mexican genus is *Dorstenia*, whose species are low herbs. *Toxylon pomiferum* Raf., the Osage orange or bois d'arc (known in Chihuahua as "naranjo chino"), native of the southern United States, is sometimes cultivated. It is a very spiny tree or shrub, with globose yellowish fruits sometimes 15 cm. in diameter. *Artocarpus communis* Forst., the breadfruit tree of the Pacific islands ("árbol del pan"), with large, pinnately lobed leaves and large rough fruit, is in cultivation in tropical Mexico.

Leaves peltate, the blades radiately lobed. Flowers in dense spikes. **9. CECROPIA.**

Leaves not peltate, the blades not radiately lobed.
- Flowers borne on the inside of a globose receptacle, this fleshy, with a small opening at the top ---- **4. FICUS.**
- Flowers not borne inside a receptacle.
  - Flowers of one or both sexes in aments, spikes, or racemes.
    - Pistillate flowers in spikes or aments.
      - Pistillate perianth of distinct segments; fruit very juicy, with a small seed, naked ---- **2. MORUS.**
      - Pistillate perianth tubular; fruit with only thin flesh, with a large seed, covered by the accrescent perianth ---- **3. TROPHIS.**
    - Pistillate flowers in heads.
      - Staminate flowers with a 4-parted perianth ---- **1. CHLOROPHORA.**
      - Staminate flowers without a perianth ---- **8. SAHAGUNIA.**
  - Flowers of one or both sexes capitate, borne on a flat or rounded receptacle, or solitary.
    - Leaves very densely long-hairy; flowers borne on a flat receptacle. **7. CASTILLA.**
    - Leaves never densely long-hairy; flowers not borne on a flat receptacle.
      - Pistillate flowers sessile and usually solitary in the axils. **6. PSEUDOLMEDIA.**
      - Pistillate flowers in heads or on a receptacle.
        - Pistillate flowers one on each receptacle ---- **5. BROSIMUM.**
        - Pistillate flowers more than one to each head or receptacle.
          - Inflorescence wholly of heads; leaves entire ---- **10. COUSSAPOA.**
          - Inflorescence partly of spikes (staminate); leaves usually toothed.
            - Staminate flowers wtih a 4-parted perianth. **1. CHLOROPHORA.**
            - Staminate flowers without a perianth ---- **8. SAHAGUNIA.**

1. CHLOROPHORA Gaud. in Freyc. Voy. Bot. 508. 1826.

Leaves glabrous or nearly so ---- **1. C. tinctoria.**
Leaves densely pubescent on both surfaces ---- **2. C. mollis.**

1. Chlorophora tinctoria (L.) Gaud. in Freyc. Voy. Bot. 508. 1826.

Morus tinctoria L. Sp. Pl. 986. 1753.

Chiefly on stream banks and seashores, San Luis Potosí to Yucatán and Tabasco; reported from Tamaulipas, Oaxaca, Michoacán, and Guerrero. Central America, West Indies, and tropical South America; type from Jamaica.

Shrub or tree, sometimes 20 meters high, with a trunk 10 to 80 cm. in diameter, the bark brownish gray or light brown, with few shallow furrows, the branches spreading, often armed with sharp axillary spines; leaves deciduous, ovate or oval, caudate-acuminate, bright dark green, entire or ser-

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rate (both kinds often on the same branches); flowers dioecious, the staminate in slender dense catkins, the pistillate in globose heads, the receptacle fleshy in fruit; seeds brown; wood light yellow, becoming darker on exposure, hard, heavy, close-grained, strong, tough, taking an excellent polish, its specific gravity about 0.71 (reported as high as 0.98). "Moral liso," "moral de clavo" (Tabasco); "palo mora" (Colombia, Isthmus of Tehuantepec); "moral amarillo," "moradilla" (Veracruz); "yaga-huil" (Oaxaca, Zapotec, *Reko*); "moral" (Tabasco, Oaxaca, etc., Colombia); "palo moral" (Oaxaca); "palo amarillo" (Tabasco, etc., El Salvador); "mora" (Sinaloa, El Salvador, Guatemala, Honduras, Costa Rica, Santo Domingo, Porto Rico, Nicaragua); "palo de mora" (Costa Rica, Porto Rico); "dinde" (Colombia); "moral del país," "mora blanca," "mora de loma," "fustete," "mora de piedra" (Cuba); "brasil" (Costa Rica); "mora macho," "palo amarillo" (Santo Domingo).

The wood is very durable and is used for furniture, interior finish, wheels, etc. Its most important use, however, is as a dye-wood; it furnishes a yellow, brown, or green dye, the coloring properties being due to two principles, morin or morindon, and moritannic acid. It is the fustic of commerce,[1] long an important article of export to Europe and the United States from tropical America. Large quantities have been exported from Mexico, especially from Tabasco. It is usually prepared in the form of sticks 60 to 120 cm. long and 7.5 to 20 cm. in diameter. The bark is used sometimes for tanning.

Various medicinal properties are reported for this tree, in Central America and the West Indies. The bitter bark, with a disagreeable odor, is said to be astringent, tonic, and in large doses purgative; it has been used for venereal diseases. The ashes of the wood have been used in Jamaica for gout and rheumatism. The fruit is astringent and useful in the form of a gargle for sore throat and mouth. The root is reputed diuretic. In Nicaragua an infusion of the flowers is used for colds. When ripe the fruit is sweet and full of milky juice, and it is sometimes eaten.

2. **Chlorophora mollis** Fernald, Proc. Amer. Acad. 40: 52. 1904.

Known only from the type locality, Tomellín Canyon, Oaxaca.

Similar to the preceding species except for the copious pubescence on all parts.

2. MORUS L. Sp. Pl. 986. 1753.

REFERENCE: Bureau in DC. Prodr. 17: 237–249. 1873.

Trees; leaves thin, deciduous, 3-nerved, dentate or often lobed, especially on young branches; flowers green, monoecious, the two kinds of flowers in separate catkins; fruit a syncarp, composed of numerous small juicy 1-seeded drupes.

One other species, *M. rubra* L., the red mulberry, is native in the United States. With regard to it, Havard says,[2] "There is some ground for belief that our native Red Mulberry was cultivated [by the Indians], the fine quality and great quantity of the fruit being mentioned by De Soto and others." *Morus alba* L., native of Asia, the white mulberry ("moral blanco"), with sweet and insipid, white or violet fruit is cultivated in Mexico. It has become naturalized in the United States, where it was introduced at an early date as food for silkworms. It is said to have been introduced into Mexico for the same purpose about 1522. Mulberries of other species also have been used for feeding silkworms. *Morus nigra* L., the black mulberry ("moral negro"), of Asiatic origin, is cultivated in Mexico for its large, juicy, well-flavored, red or black fruit.

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[1] *Rhus cotinus* L., of Europe, also is known as fustic.

[2] Bull. Torrey Club 22: 104. 1895.

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The Spanish name for the mulberry fruit is "mora"; for the tree, "moral"; the name "morera" is applied to the white mulberry tree. Aslain gives the Huastec name for mulberry tree as "tzitzi." According to Belmar, the Mixe names are "hamdek" (fruit) and "hamdek-kiup" (tree).

Pistillate spikes elongate, lax, many-flowered; leaves thin, scarcely or not at all scabrous on the upper surface, glabrate beneath__1. **M. celtidifolia.**

Pistillate spikes short, dense, few-flowered; leaves thick, very scabrous on the upper surface, copiously pubescent beneath_____2. **M. microphylla.**

1. **Morus celtidifolia** H. B. K. Nov. Gen. & Sp. **2**: 33. 1817.

Morus mexicana Benth. Pl. Hartw. 71. 1840.

Morus mollis Rusby, Bull. Torrey Club **38**: 145. 1911.

Coahuila to Veracruz and Oaxaca; reported from Yucatán. Guatemala and Costa Rica; Colombia to Peru; type from Ecuador.

Tree, 5.5 to 9 meters high; leaves oval-ovate, 5 to 15 cm. long, bright green, cuspidate-acuminate; fruit at first red but finally black. The fruit is known generally as "mora," the tree as "moral"; "palo moral" (Oaxaca); "yaga-biyozaa" (Oaxaca, Zapotec, *Reko*); "brasil" (Costa Rica).

The species is somewhat variable in leaf form and in size of fruit, but with the material available it does not seem necessary to recognize either of the segregates. This is perhaps the species to which Sessé and Mociño[1] apply the name "*Morus tartarica*," although it is not certain that they do not refer to one of the introduced species. It is probably to this tree that Sahagún refers: "In this country [New Spain] there are mulberry trees. They are called *amacapulin* [paper cherry]. This tree is smooth and branched. The branches are very numerous, and the leaves are crowded and green, a little paler beneath. It produces mulberries a little smaller than those of Castile." In Ecuador the wood of this species is said to be valued for building purposes.

2. **Morus microphylla** Buckl. Proc. Acad. Phila. **1862**: 8. 1863.

Morus microphilyra Greene, Leaflets **2**: 120. 1910.

Chihuahua to Durango. Southern Arizona to western Texas (type locality).

Small tree, 4.5 to 7.5 meters high, with a trunk 30 cm. in diameter, the crown dense and compact, or often a shrub in Mexico; bark gray, furrowed, covered with small scales; fruit 1 to 1.5 cm. long, red or finally black; wood hard, close-grained, elastic, light brown, its specific gravity about 0.77. "Mora," "moral."

The wood is used to a small extent in Mexico by carpenters, and was employed by the Indians of Texas for bows. The fruit is rather sour and varies in size according to the amount of water the tree receives. It is sometimes found in markets.

This species may not be distinct from the preceding one. The leaves are very variable and often deeply lobed, especially on young shoots.

3. TROPHIS L. Syst. Nat. ed. 10. 2: 1289. 1759.

REFERENCE: Bureau in DC. Prodr. **17**: 251–254. 1873.

Trees, unarmed; leaves deciduous or persistent, entire or dentate; flowers dioecious, green, spicate, racemose, or paniculate; fruit small, subglobose, with thin flesh and a large seed.

Fruit smooth, sessile or short-pedicellate; leaves usually more than 3 cm. wide. 1. **T. racemosa.**

Fruit tuberculate, long-pedicellate; leaves 3 cm. wide or less___2. **T. mexicana.**

1. **Trophis racemosa** (L.) Urban, Symb. Antill. **4**: 195. 1903.

Bucephalon racemosum L. Sp. Pl. 1190. 1753.

Trophis americana L. Syst. Nat. ed. 10. **2**: 1289. 1759.

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[1] Pl. Nov. Hisp. 160. 1887.

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Trophis ramon Schlecht. Linnaea 6: 357. 1831.

Tamaulipas to Sinaloa, Oaxaca, Veracruz, and Tabasco. Central America, Colombia, and the West Indies.

Tree, 15 meters high or less, with brown bark, the trunk usually 35 to 40 cm. in diameter; leaves short-petiolate, oblong to oval, 8 to 15 cm. long, short-acuminate, coriaceous, often very rough, entire or inconspicuously dentate. "Ramón" (Veracruz, Tabasco, Cuba, Santo Domingo; a corruption of this name, "ramoon," used also in Jamaica); "confitura" (Oaxaca, *Reko*); "huanchal" (Oaxaca); "leche María" (Oaxaca); "ramoncillo" (Tabasco); "ramón de Castilla" (Veracruz, *Villada*); "cafecillo" (Nicaragua); "ramón de caballos" (Cuba).

The tree is much used in Mexico, as well as elsewhere, as fodder for domestic animals, the cut branches being often transported to some distance for the purpose. The fruit is said to be edible, although the flesh is certainly very scant. The bark contains tannin and has been used in medicine as an astringent.

It may be that more than one species is included in the material referred here. The leaves are somewhat variable in shape and texture. The pistillate inflorescence is usually simply spicate, but it is sometimes branched. *T. glabrata* Liebm.[1], from the description, does not seem to differ essentially.

2. Trophis mexicana (Liebm.) Bureau in DC. Prodr. 17: 253. 1873.

Sorocea mexicana Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 335. 1851.

Trophis chiapensis T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 178. 1915.

Veracruz, Oaxaca, and Chiapas; type from Tlapacoyan, Veracruz.

Medium-sized tree; leaves narrowly elliptic-oblong, with a long, narrow, often curved tip. conspicuously serrate, smooth, bright green.

4. FICUS L. Sp. Pl. 10. 59. 1753.

REFERENCE: Standley, The Mexican and Central American species of *Ficus*, Contr. U. S. Nat. Herb. 20: 1–35. 1917; Urbina, Los Amates de Hernández, Naturaleza 7: 93–114. 1900; M. Urbina, Los Amates de Hernández ó higueras Mexicanas, Naturaleza III. 1: 32–53. 1912.

Large or small trees; leaves entire (in the native Mexican species); flowers minute, borne on the inner surface of a more or less globose receptacle, this succulent in age, with a very small opening at the apex, this closed by small scales, the receptacle subtended at the base by a lobed involucre.

Many if not most of the Mexican figs are of very peculiar growth. They are hemiparasites; that is, they often begin their growth upon other plants, usually palms, germinating and developing a stem from which aerial roots descend to the ground and take root.[2] In this way the plants in their young stages are often vinelike. With age, the aerial roots increase in size and form a trunk which gradually envelops completely the host plant. The stems at first are flat, broad, and thin, and as they increase in size several will unite, assuming irregular and fantastic forms. Ultimately the host plant dies but often it persists for a long time, and it is not unusual to see the fronds of a palm rising from the crown of a large fig tree. Figs of this habit of growth are known generally as "matapalo." Sometimes the plants begin their growth upon cliffs, developing their thin trunks against the rocks.

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[1] Dansk. Vid. Selsk. Skrivt. V. 2: 314. 1851.

[2] See Trelease, Illustrations of a "strangling" fig tree. Rept. Mo. Bot. Gard. 16: 161–165. *pl. 39–45.* 1905.

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Large fig trees, too, often send down from their branches aerial roots which take hold of the soil and finally develop into trunks. In this way trees of the banyan type are formed, some of them of enormous size.

Because of their broad, dense crowns and handsome foliage many of the Mexican figs make attractive shade trees. Some exotic species are cultivated for the same purpose. *F. nitida* Thunb., an Asiatic plant with small lustrous obovate leaves is seen frequently in parks, being known as "laurel de la India," "laurel," and "álamo extranjero." A specimen of *F. crassinervia* Willd., from Puebla, was probably taken from a cultivated tree; the species is a West Indian one. *F. religiosa* L., of the East Indies ("laurel de India," "álamo cubano"), with very long-acuminate leaves, also is cultivated. *F. elastica* Roxb., another Old World species, is frequent in parks and gardens, being one of the finest shade trees grown in the tropics. It is one of the sources of India rubber, and is the well-known rubber plant which is cultivated for ornament in the United States and elsewhere. Its leaves are larger than those of most Mexican species, and the fruit is of distinct shape, oblong rather than globose, as in most figs. The common edible fig, *F. carica* L. ("higuera," "higo"), is extensively cultivated in Mexico for its fruit, which under favorable conditions is produced at all times of the year. It differs from all the American species in having lobed leaves. It was doubtless brought to Mexico at a very early date by the Spaniards. The Jesuits introduced the fig tree into Baja California in the eighteenth century, and it is said to have been the only fruit, except grapes, which was thoroughly successful there.

The fruit of all the species is edible, but often the receptacles are so small and dry that they are not very palatable. They are a favorite food of many kinds of birds and of domestic animals.

The milky juice of the Mexican species yields a kind of rubber which might become of some commercial importance. This is said to have been used locally for treating fractured bones and for similar purposes. Some of the South American species are said to produce commercial rubber.

Few medicinal uses are reported for this genus in Mexico. The early inhabitants are said to have used the root, to which purgative properties are ascribed, in the treatment of fevers and chest affections, and the milky juice for ulcers. The juice is often applied to warts, but with what success is not stated. The juice of some of the South American species is reported to be extremely poisonous.

The wood of the fig trees is soft and light and of little value. The large trunks, however, are often made into canoes. In preconquest days the bark was of great importance, for it was one of the sources of the bark paper used by the Aztecs for their records and correspondence. Some of this paper is still preserved in the ancient manuscripts. It is generally stated that the species used for the purpose was *F. petiolaris*. This is, it is true, the species described by Hernández, but it is probable that other species were used indiscriminately. Plants of other families were used likewise for the same purpose, and it is now uncertain what one was most commonly employed.

It was believed that the manufacture of bark paper in Mexico had become obsolete, but Professor Starr, of the University of Chicago, found a few years ago that the method of preparation was still known to some of the Otomí Indians of Hidalgo. He secured specimens of the paper and has published an account of its manufacture.[1] He states that the trees used are "xalama" (*Ficus* sp.), "jonote" (*Heliocarpus*), "moral," and "dragón." The name

[1] Starr, In Indian Mexico, pp. 245–246, 259, 268.

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"moral" probably refers to some plant of the family Moraceae, and "dragón" perhaps to a *Jatropha*. After being stripped from the trees, the bark is washed with lye water taken from the corn soaked for *tortillas*, washed in fresh water, thoroughly boiled, and split into thin strips. These the women arrange carefully upon a wooden plank and then beat with a stone until a sheet of paper results. The side of the sheet next to the board is smooth, the other somewhat rough. The paper is dried in the sun. The paper obtained from the "moral" is white; that from "xalama" purplish. It is said that the bark of the "ule" (*Castilla*) also is used.

Because of the purposes for which the paper is employed, its preparation is generally conducted with great secrecy. It is used for decorations in various ceremonies, especially those of pagan origin. More commonly, however, it is used for "brujería" (witchcraft), and for this it is cut into "muñecos," representing human beings, horses, and other animals, and these are employed to work injury to people and domestic animals, being buried in front of a house or in a corral. The *muñecos* are employed also for curing disease, applied directly to the affected part.

This ceremonial use of the bark paper is the last remnant of a common practice of ancient times. Before the conquest paper banners were employed as offerings to the gods at certain feasts, and crowns of paper also were offered, and were worn by those who took part in the ceremonies.

The vernacular names applied to the species of *Ficus* are very numerous, and many of them are listed under the species enumerated below. In Jalisco, according to Urbina, they are usually known as "camichín" or "zalate." The former name, which is used elsewhere also, is applied to the species having smaller fruits than those known by the name "zalate." The word *camichín*, he states, is written more properly *coamichin* (=*coatl*, snake+*michin*, fish=fish-snake=eel). This name was probably given because of the adventitious roots, which might be taken to resemble eels. A name widely used in Mexico for fig trees is *amate;* this is a modification of the Nahuatl word *amatl*, "paper," applied to the tree. It is interesting to note that the Tarascan word for paper, *siranda*, also is used as a name for the fig tree. The name "macahuite" (Nahuatl, *ama-cuahuitl*=fig-tree) is said to be used in central Mexico. The word *amatl* is preserved in such place names as Amatitlán, "among the fig trees"; Amatepec, "the hill of the figs"; Amecameca, "place where they wear fig shirts."

Peduncles solitary; involucre trilobate; stamens 2. (Subgenus PHARMACOSYCE.)
- Leaves hirtellous or short-pilose beneath; receptacles pilose or hirtellous ..... 1. F. glaucescens.
- Leaves glabrous or merely scabrous beneath; receptacles glabrate or scabrous.
  - Branchlets densely pilose-sericeous ..... 2. F. radulina.
  - Branchlets glabrous or puberulent.
    - Leaves rounded and apiculate at the apex ..... 5. F. radula.
    - Leaves gradually acute or acuminate at the apex.
      - Leaf blades about 4 times as long as broad, acute at the base, glabrous ..... 3. F. segoviae.
      - Leaf blades not more than two and a half times as long as broad, usually very obtuse or rounded at the base, commonly scabrous. 4. F. mexicana.

Peduncles geminate; involucre bilobate; stamen 1. (Subgenus UROSTIGMA.)
- Involucre very asymmetric, attached excentrically to the peduncle. 6. F. tecolutensis.

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Involucre symmetric, attached centrally to the peduncle.
- Receptacles all or partly sessile.
  - Receptacles partly sessile and partly pedunculate on the same plant. **7. F. cookii.**
  - Receptacles all sessile.
    - Leaves cuspidate at the apex, with a long acute acumen. **8. F. panamensis.**
    - Leaves not cuspidate at the apex.
      - Involucre small, about 5 mm. in greatest diameter, inconspicuous; receptacles glabrous ---------- **9. F. kellermannii.**
      - Involucre large, conspicuous, inclosing the receptacle for half its length or more; receptacles finely pubescent or in age glabrate. **10. F. cotinifolia.** ✓
- Receptacles all pedunculate.
  - Leaves conspicuously pubescent beneath.
    - Leaf blades suborbicular, as broad as long, deeply cordate at the base, white-barbate beneath along the costa ---------- **11. F. petiolaris.** ✓
    - Leaf blades usually conspicuously longer than broad, the pubescence of short hairs scattered over the lower surface.
      - Stipules glabrous or nearly so; receptacles pyriform. Leaves cordate-ovate or ovate-deltoid ---------- **12. F. palmeri.**
      - Stipules densely sericeous; receptacles globose.
        - Receptacles 13 to 17 mm. in diameter; leaf blades 6 to 19 cm. long, broadest at or near the middle ---------- **16. F. lapathifolia.** ✓
        - Receptacles 10 to 13 mm. in diameter; leaf blades 4.5 to 12 cm. long, usually broadest at or near the base.
          - Involucre 10 to 15 mm. in greatest diameter; receptacles with fine appressed pubescence or glabrate; peduncles 2 to 4 mm. long ---------- **14. F. pringlei.** ✓
          - Involucre 4 to 6 mm. in diameter; receptacles short-villous; peduncles 5 to 7 mm. long ---------- **15. F. microchlamys.**
  - Leaves glabrous beneath or nearly so.
    - Receptacles 4 to 12 mm. in diameter.
      - Ostiole of the receptacle depressed; leaf blades 1.5 to 4.7 cm. wide ---------- **17. F. padifolia.** ✓
      - Ostiole plane or elevated; leaf blades 5 to 9.5 cm. wide. **18. F. lentiginosa.**
    - Receptacles 15 to 25 mm. in diameter.
      - Stipules ferruginous-sericeous ---------- **19. F. glycicarpa.**
      - Stipules glabrous or minutely puberulent.
        - Leaf blades cuneate-obovate, rounded at the apex. **20. F. involuta.**
        - Leaf blades oblong to oval or ovate-oval, broadest at or below the middle.
          - Leaf blades cordate or subcordate at the base, with 5 to 9 lateral veins on each side.
            - Petioles 3.5 to 7 cm. long; leaves bright green; receptacles pubescent ---------- **21. F. jonesii.**
            - Petioles 1.5 to 3.5 cm. long; leaves glaucescent beneath; receptacles glabrous ---------- **13. F. brandegei.**
          - Leaf blades rounded or emarginate at the base, with usually 8 to 13 lateral veins on each side.

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Leaf blades emarginate at the base; receptacles densely puberulent ..... 22. F. goldmanii.
Leaf blades rounded at the base; receptacles glabrous or nearly so ..... 23. F. yucatanensis.

1. **Ficus glaucescens** (Liebm.) Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 300. 1867.
Pharmacosycea glaucescens Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 332. 1851.
Pharmacosycea hernandezii Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 332. 1851.
Ficus hernandezii Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 300. 1867.
Ficus guadalajarana S. Wats. Proc. Amer. Acad. 26: 151. 1891.

Veracruz to Sinaloa and Oaxaca; type from Mecapalco, Veracruz. Central America.

Large or small tree; stipules 1 to 2 cm. long; leaves oval-oblong or obovate-oval, 8 to 23 cm. long, very obtuse or apiculate at the apex; receptacles 1.5 to 2.5 cm. in diameter. "Higo loxe grande" (Oaxaca).

2. **Ficus radulina** S. Wats. Proc. Amer. Acad. 26: 151. 1891.

Chihuahua and Sonora; type collected near Batopilas, Chihuahua.

Large tree with whitish or yellowish branches; stipules 6 to 8 cm. long; leaves oblong to oval-elliptic, 9 to 18 cm. long; receptacles 1.5 to 2 cm. in diameter, spotted with light and dark green. "Nacapuli," "higuera" (Sonora); "salate" (Chihuahua).

3. **Ficus segoviae** Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 300. 1867.
Pharmacosycea angustifolia Liebm. Dansk. Vid. Selsk. Skrivt. V. 3: 333. 1851.
Not *Ficus angustifolia* Roxb. 1814.

Veracruz to Guerrero and Oaxaca. Guatemala and Nicaragua (type locality).

Stipules 2 to 5.5 cm. long; leaf blades narrowly elliptic, 10 to 20 cm. long; receptacles 1.5 to 3 cm. in diameter. "Macahuite" (Oaxaca).

4. **Ficus mexicana** Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 299. 1867.
Pharmacosycea mexicana Miquel, Versl. Med. Kon. Akad. Amsterdam 13: 416. 1862.

San Luis Potosí to Sinaloa, Oaxaca, and Yucatán.

Large tree, sometimes 20 meters high, with a trunk nearly 2 meters in diameter, the bark pale brownish or yellowish; stipules 3.5 to 10 cm. long; leaves oval or elliptic-oblong, 8 to 20 cm. long; receptacles about 2 cm. in diameter, light green. "Copoy" (San Luis Potosí, *Palmer*); "sabali" (Sinaloa).

5. **Ficus radula** Willd. Sp. Pl. 4: 1144. 1806.

Veracruz to Yucatán and Oaxaca. Central America, Colombia, and Venezuela (type locality).

Large or small tree, with brownish gray branches; stipules 1 to 1.5 cm. long; leaves oblong to oval, 8 to 16 cm. long; receptacles 1.5 to 3 cm. in diameter. "Macahuite" (Oaxaca; from the Nahuatl, "ama-cuahuitl").

6. **Ficus tecolutensis** (Liebm.) Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 299. 1867.
Urostigma tecolutense Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 324. 1851.

Veracruz to Yucatán and Oaxaca; type from Tecolutla, Veracruz. Guatemala.

Stipules 1 to 1.5 cm. long; leaves oblong, oval, or oval-obovate, 6 to 10 cm. long, obtuse or acutish at the apex, obtuse or emarginate at the base, glabrous; receptacles 5 to 8 mm. in diameter. "Matapalo" "amate," "matapalo liso," "macahuite" (Oaxaca).

7. **Ficus cookii** Standl. Contr. U. S. Nat. Herb. 20: 15. 1917.

Chiapas; type from San Vicente. Guatemala.

Large tree; stipules 1 to 1.5 cm. long; leaves oval or orbicular-ovate, 6 to 11 cm. long, rounded at the apex, shallowly cordate at the base; receptacles about 1 cm. in diameter.

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A very remarkable species because of the presence of both sessile and pedunculate receptacles upon the same tree.

8. **Ficus panamensis** Standl. Contr. U. S. Nat. Herb. **20**: 15. 1917.

Tabasco. Central America and Colombia; type from Panama.

Stipules 2 cm. long; leaves oblong or obovate-oblong, 9 to 16 cm. long, glabrous; receptacles 1 cm. in diameter. "Amatillo" (Tabasco).

9. **Ficus kellermannii** Standl. Contr. U. S. Nat. Herb. **20**: 18. 1917.

Oaxaca. Guatemala; type from El Rancho.

Stipules 1 to 2 cm. long; leaves oval-oblong, obovate-oval, or oval, 5 to 14 cm. long, short-hirtellous beneath, emarginate or subcordate at base; receptacles 8 to 10 mm. in diameter. "Higo loxe chico" (Oaxaca).

10. **Ficus cotinifolia** H. B. K. Nov. Gen. & Sp. **2**: 49. 1817.

Ficus myxaefolia Kunth & Bouché, Ind. Sem. Hort. Berol. 18. 1846.

Urostigma longipes Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 321. 1851.

Urostigma glaucum Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 322. 1851.

Ficus subrotundifolia Greenm. Proc. Amer. Acad. **41**: 237. 1905.

Chihuahua to Baja California, Oaxaca, and Yucatán; type collected on the Acapulco road near La Venta del Egido. Costa Rica.

Large or small tree, sometimes 15 meters high, with a trunk a meter in diameter, the branches few, large, spreading; stipules 5 to 13 mm. long; leaves oblong to orbicular, 5 to 13 cm. long, very variable; receptacles 6 to 11 mm. in diameter, whitish, often spotted. "Copó," "coobó," "álamo" (Yucatán); "higuerón" (Tamaulipas, San Luis Potosí); "amate prieto" (Morelos).

The milky juice mixed with the powdered bark is applied to wounds and bruises. This may be the "tilamatl" ("black-fig") described by Hernández.

11. **Ficus petiolaris** H. B. K. Nov. Gen. & Sp. **2**: 49. 1817.

Ficus jaliscana S. Wats. Proc. Amer. Acad. **26**: 150. 1891.

Sonora to Guerrero and Morelos; reported from Oaxaca; type collected near Mazatlán, Guerrero.

Large or small tree with white trunk; leaves 6.5 to 15 cm. wide; receptacles 1 to 1.5 cm. in diameter. The following names are reported for this species, although it is probable that most of them are applied to others also: "Tepeamatl" or "tepeamate" (Guerrero; the former the Nahuatl term, meaning "hill-fig"); "tescalama," "tescalamate," or "texcalamate" (Morelos, Durango, Guanajuato, etc.; in Nahuatl, *texcalamatl*="lava-fig," this name, according to Robelo, given because the tree sometimes grows on lava rock); "palo chilamate" (Oaxaca, *Reko;* from the Nahuatl, *chil-amatl*); "higuera" (Durango, Sinaloa); "palo María," "higuerón" (Sinaloa, Mexico); "higuerote," "texcalama lechosa" (Sinaloa); "amate" (Oaxaca); "amacostic" (Morelos); "amate amarillo" (Morelos, Guerrero).

This species has frequently been reported[1] from Mexico as *F. nymphaeifolia* L. That is a South American species, which is somewhat similar but nevertheless quite distinct.

This species is discussed by Hernández[2] in a chapter entitled "De Amacoztic, seu Papyro lutea, seu Tepematl, Sycomoro Saxatili Mexicana." His remarks are as follows: "The *Amacoztic*, which some call *Texcalamatl*, or rock-paper, and others *Tepeamatl*, is a large tree which has the leaves broad, almost round, thick and purplish like ivy, and nearly heart-shaped; the bark is on one side yellow inclining to green, and on the other red; it has the fruits on the same trunks, which are smooth like that of a fig tree; the fruit resembles small

[1] As by Sessé & Mociño, Pl. Nov. Hisp. 180. 1887.

[2] Thesaurus 81. 1651.

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figs; it is purple and full of small red seeds; the tree is fastened to the rocks, and is a wonderful thing. The leaves have no perceptible odor or flavor; their temperament is moist and cold. The decoction of the roots allays the thirst of those who suffer from fever, alleviates pains of the chest, is purgative and vomitive, and it is prepared by boiling three ounces of the roots with three pounds of water until the half is consumed; its milk cures sores of the lips and chronic ulcers. The tree grows in mountainous and rough places about Chietla, embracing the rocks, as I have said, and as the name itself indicates. There is another kind that has the same name and temperament, which, they say, serves only for furnishing straight, smooth poles." Hernández also gives two easily recognizable figures of the plant (pp. 82, 409).

Dr. Fernando Altamirano, quoted by Urbina,[1] describes the gum or rubber obtained from this (and probably also from other) species of *Ficus* as follows: "The commercial *Texcalama* appears as rounded masses of variable dimensions. This substance is elastic and adhesive and very ductile, gray in color, and capable of being formed into membranes as delicate as soap bubbles, being in this state white and transparent; exposed to the air it hardens and assumes a yellow tint, for which reason it should be kept in vessels full of water. In boiling water it softens and becomes more sticky.

"Its density is greater than that of water; its odor is urine-like, and it has scarcely any taste.

"In its analysis I found 15 per cent of caoutchouc, 55 per cent of a resin soluble in alcohol, and 5 per cent of a resin soluble in ether."

This gum is used by surgeons and others in Mexico for treating broken bones, hernia, etc.

12. **Ficus palmeri** S. Wats. Proc. Amer. Acad. **24**: 77. 1889.

Baja California, on rocky hillsides; type from San Martín Island.

Tree, 4.5 to 10 meters high; with white trunk; stipules 1.5 to 2 cm. long; leaves 6 to 14 cm. long; receptacles 12 to 15 mm. in diameter. "Salate."

This is presumably the tree described by Clavigero[2] as "anabá," in the following words: "*Anabá* is the name of a fruit similar to the fig, and of the tree on which it is borne. The latter is large, the bark of its trunk and branches whitish like that of the fig tree, and the fruit similar in color and shape to the early figs but smaller, less juicy, and without the sweet flavor of our figs. Nevertheless the Californians esteem it so highly that when they hear of an *anabá* with ripe fruit they go to hunt for it and gather a supply of the fruit, even though it may be four or five leagues distant. The wood of the *anabá* is absolutely useless, and the roots are usually broader than thick, for since the tree grows among rocks, it introduces its roots into the clefts, or, in default of these, extends them over the rocks themselves. In Mexico, where it is known by the name of *zalate*, it fruits better and attains a larger size."

13. **Ficus brandegei** Standl. Contr. U. S. Nat. Herb. **20**: 22. 1917.

Known only from the type locality, San José del Cabo, Baja California.

Similar to the last species except for the complete absence of pubescence upon the leaves.

14. **Ficus pringlei** S. Wats. Proc. Amer. Acad. **26**: 150. 1891.

Jalisco; type from the barranca near Guadalajara.

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[1] Naturaleza **7**: 98. 1900.

[2] Historia de la California, 1789. This is the first work in which Baja California plants were described. Clavigero's information was furnished by a brother of the Jesuit order, whose descriptions are remarkably vivid and accurate.

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Small or medium-sized tree; stipules 1.5 cm. long; leaves ovate-oval or deltoid-ovate, 4.5 to 8 cm. long, very obtuse or rounded at the apex, subcordate or emarginate at the base.

15. Ficus microchlamys Standl. Contr. U. S. Nat. Herb. **20**: 23. 1917.

Sinaloa, Tepic, Jalisco, and Veracruz; type from Guadalajara.

Large tree; stipules 7 mm. long; leaves oblong to rounded-ovate, 6 to 12 cm. long, rounded or obtuse at the apex, subcordate or emarginate at the base. "Salate bronco" (Sinaloa).

16. Ficus lapathifolia (Liebm.) Miquel, Ann. Mus. Bot. Lugd. Bat. **3**: 297. 1867.

Urostigma lapathifolium Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 319. 1851.

Tamaulipas to Veracruz, Chiapas, and Guerrero; type from Yecoatla and Colipa, Veracruz. Guatemala.

Stipules 1.5 to 1.8 cm. long; leaves oval to broadly oblong.

17. Ficus padifolia H. B. K. Nov. Gen. & Sp. **2**: 47. 1817.

Ficus complicata H. B. K. Nov. Gen. & Sp. **2**: 48. 1817.

Urostigma schiedeanum Miquel, Lond. Journ. Bot. **6**: 539. 1847.

Urostigma complicatum Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 325. 1851.

Urostigma baccatum Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 327. 1851.

Urostigma turbinatum Liebm. Dansk. Vid. Selsk. Skrivt. V. **2**: 328. 1851.

Urostigma sulcipes Miquel, Versl. Med. Kon. Akad. Amsterdam **13**: 413. 1862.

Ficus fasciculata S. Wats. Proc. Amer. Acad. **24**: 78. 1889.

Ficus sonorae S. Wats. Proc. Amer. Acad. **24**: 78. 1889.

Tamaulipas to Sonora, Oaxaca, and Tabasco; type from Acapulco, Guerrero. Central America.

Small or often a very large tree, as much as 30 meters high, with broad, dense crown and numerous trunks and aerial roots; stipules 5 to 15 mm. long; leaves mostly ovate or elliptic, 4 to 12 cm. long, acute or acuminate. "Nacapuli" (Sonora); "camichín" (Colima, Sinaloa, Jalisco); "comuchín" (Michoacán, Guerrero); "palo de coco" (Oaxaca, *Liebmann*); "amatillo," "capulín grande" (Tabasco); "samatito" (Guerrero, Oaxaca, Morelos); "amesquite" (Morelos); "matapalo" (Oaxaca); "higuito" (Costa Rica); "cozahuique" (Oaxaca, *Villada*); "jalamate," "cabra-higo" (Morelos, *Urbina*).

One of the handsomest of Mexican trees, often with an immense crown of dark green leaves. It has been reported from Mexico as *F. ligustrina* Kunth & Bouché, a South American species. The fruit is usually tinged or spotted with red or purple; it is sweet and much eaten by children and birds, and sometimes it is sold in the markets.

Urbina[1] considers that this is the "amazquitl" of Hernández, who speaks of the value of the tree for shade, and states that a decoction of the root bark was given to fever patients. The "hoeiamatl" of Hernández is perhaps the same species; this was employed as a remedy for various skin diseases and for pains and sourness of the stomach. Another wild fig described by Hernández under the name "itzamatl" may also be *Ficus padifolia*. This, Hernández states, was called "higo de Indias" by the Spaniards.

18. Ficus lentiginosa Vahl, Enum. Pl. **2**: 183. 1806.

Guerrero to Oaxaca and Yucatán. West Indies; type from Montserrat.

Stipules 1 to 1.5 cm. long; leaves oval or ovate-oval, 7.5 to 16 cm. long, obtuse or rounded and often short-pointed at the apex, bright green; receptacles 8 to 9 mm. in diameter. "Jaguey" (Porto Rico).

For an illustration of a flowering branch see Contr. U. S. Nat. Herb. **8**: *pl. 35*.

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[1] Naturaleza **7**: 99. 1900.

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19. **Ficus glycicarpa** Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 297. 1867.

Urostigma glycicarpum Miquel, Versl. Med. Kon. Akad. Amsterdam 13: 409. 1862.

Veracruz; type from Hacienda de la Laguna.

Stipules 1 cm. long; leaves elliptic-oblong or obovate, 7 to 20 cm. long, obtuse or rounded and short-pointed at the apex; receptacles 1.5 to 2 cm. in diameter.

20. **Ficus involuta** (Liebm.) Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867.

Ficus obtusifolia H. B. K. Nov. Gen. & Sp. 2: 49. 1817. Not *F. obtusifolia* Roxb. 1814.

Urostigma involutum Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 323. 1851.

Urostigma bonplandianum Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 323. 1851.

Ficus bonplandiana Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867.

Sinaloa to San Luis Potosí, Yucatán, and Oaxaca. Central America; type from Nicaragua.

Large tree, sometimes with a trunk 1.8 meters in diameter and a crown 19 meters broad; stipules 1.5 to 3 cm. long; leaves 11 to 21 cm. long; receptacles 1.5 to 2 cm. in diameter. "Amate" (Guererro); "amate blanco" (San Luis Potosí, Morelos); "matapalo" (Oaxaca); "palo de sal" (Costa Rica).

The fruit is edible. The milky juice of the branches is applied externally for pain in the stomach.

21. **Ficus jonesii** Standl. Contr. U. S. Nat. Herb. 20: 31. 1917.

Sinaloa and Jalisco; type from La Palma, Jalisco.

Large tree; leaves oval-oblong to broadly ovate-oblong; receptacles 2.5 cm. in diameter.

The writer is inclined to believe that the receptacles described for this may belong to a different tree from the one which furnished the leaves, and that the latter may be referable to *F. lentiginosa*.

22. **Ficus goldmanii** Standl. Contr. U. S. Nat. Herb. 20: 32. 1917.

Sonora and Sinaloa to Puebla and Oaxaca; type from Alamos, Sonora.

Large tree, with a short, very thick trunk supported by buttresses; leaves oblong or elliptic-oblong, 8 to 20 cm. long; receptacles 2 to 2.5 cm. in diameter. "Chalate" (Durango).

23. **Ficus yucatanensis** Standl. Contr. U. S. Nat. Herb. 20: 33. 1917.

Yucatán; type from Chichen Itzá.

Stipules 1 to 1.5 cm. long; leaves oval or oval-oblong, 8 to 20 cm. long; receptacles 2 cm. in diameter.

DOUBTFUL SPECIES.

FICUS CALYCULATA Mill. Gard. Dict. ed. 8. *Ficus* no. 11. 1768. Described from Veracruz. The description does not agree with any species known from Mexico.

FICUS FUSCESCENS (Liebm.) Miquel, Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867. *Urostigma fuscescens* Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 329. 1851. Described from Veracruz; perhaps not of this genus.

5. BROSIMUM Swartz, Prodr. Veg. Ind. Occ. 12. 1788.

Leaves oval or oblong-oval, 4.5 to 8.5 cm. wide, acute or acuminate. **1. B. alicastrum.**

Leaves oblong or lance-oblong, 2 to 3 cm. wide, obtuse or acutish. **2. B. conzattii.**

1. **Brosimum alicastrum** Swartz, Prodr. Veg. Ind. Occ. 12. 1788.

Tamaulipas to Yucatán, Tabasco, Oaxaca, and Tepic. West Indies and Central America; type from Jamaica.

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Tree, sometimes 30 meters high, with a trunk a meter in diameter, the crown broad and dense; bark gray; leaves bright green, glabrous, entire; flowers unisexual, in dense globose pedunculate heads; fruit subglobose, yellow or orange, containing a single large seed about 12 mm. broad. "Ramón" (Yucatán, Oaxaca); "ox" (Yucatán, Tabasco, Maya); "ojite" (Veracruz, Tamaulipas, Oaxaca; from the Nahuatl, "oxitl"); "nazareno" (Oaxaca, *Reko*); "oxotzin" (Veracruz, *Finck*); "capomo" (Tepic, Jalisco, Veracruz, Oaxaca); "apomo" (Sinaloa); "Juandiego" (Oaxaca, *Reko*); "ojoche" (Nicaragua); "maseco" (Guatemala, Honduras).

The wood is said to be white, or sometimes grayish or tinged with flesh color, compact, hard, and fine-grained; it is used in carpenter work. The tree is valued highly for forage, the branches being cut and fed to different kinds of stock, and the fallen leaves are eaten greedily by cattle. The tree is often planted for this purpose, and in some parts of Mexico it is a very important forage plant. The milky juice is reported to yield a kind of rubber, and is used as a calmant in asthma. It is reputed also to increase the flow of human milk, this probably a relic of the old medical theory of signatures. The seeds are said to be fattening for cattle, which are fond of them, and they are used also as human food. For the latter purpose they are boiled or roasted, and eaten alone or mixed with sugar, honey, or corn meal. They have a flavor resembling that of chestnuts and are very nutritious. The seeds are sometimes roasted and used as a substitute for coffee.

2. **Brosimum conzattii** Standl. Contr. U. S. Nat. Herb. **20**: 211. 1919.

Known only from the type locality, Cafetal San Rafael, Distrito de Pochutla, Oaxaca.

Similar to the preceding, of which it may be only a form, but with much smaller, relatively narrower leaves, the embryo with an obtuse, rather than acute, radicle.

6. PSEUDOLMEDIA Trécul, Ann. Sci. Nat. III. 8: 129. 1847.

1. **Pseudolmedia oxyphyllaria** Donn. Smith, Bot. Gaz. **20**: 294. 1895.

Veracruz. Guatemala; type from Volcán de Tecuamburro.

A tree; leaves elliptic-oblong, 11 to 23 cm. long, acuminate, entire, glabrous; flowers dioecious, the staminate ones in sessile heads, the pistillate solitary, sessile, axillary, surrounded by silky bracts.

Perhap not sufficiently distinct from *P. spuria* (Swartz) Griseb., of the Greater Antilles and Panama.

7. CASTILLA[1] Cervantes, Gaceta de Literatura de México, Suppl. July 2, 1794.

REFERENCES: Pittier, Contr. U. S. Nat. Herb. **13**: 247–279. 1910; Cook, The culture of the Central American rubber tree, U. S. Dept. Agr. Bur. Pl. Ind. Bull. **49**. 1903; Villada, El árbol del hule, Naturaleza **3**: 316–330. 1876.

1. **Castilla elastica** Cervantes, Gac. Lit. Méx. Suppl. 1794.

Castilla lactiflua Cook, Science n. ser. **18**: 438. 1903.

Veracruz to Sinaloa, Chiapas, and Yucatán; type from Veracruz.

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[1] Sometimes written *Castilloa*. The genus was named in honor of Juan Diego del Castillo (1744–1793), pharmacist and economic explorer, who came to Mexico in 1787 as a member of the famous naturalists' expedition sent out by Charles III. As a result of the labors occasioned by his work, he fell ill and died in the City of Mexico. He left a legacy of $4,000 to be used in publishing the Flora Mexicana. A manuscript by his hand, entitled "Plantas descritas en el viaje de Acapulco," is said to be preserved in the Botanical Garden at Madrid.

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Tree, attaining a height of 20 meters or more, the trunk grayish, nearly smooth; leaves distichous, deciduous, short-petiolate, oblong or oval-oblong, 25 to 40 cm. long, cordate at the base, acuminate at the apex, copiously pubescent; flowers monoecious, the 2 kinds on separate receptacles, the staminate receptacles 2 to 2.5 cm. broad, bearing numerous flowers; fruiting receptacles 4 cm. or more in diameter, contorted, the fruits becoming fleshy and brick-red. "Arbol del hule"; "tarantaqua" (Michoacán, *Leon*); "hule" (the rubber; sometimes written "ule"; derived from the Nahuatl *olli* or *ollin*); "cuauchile." Robelo gives the Nahuatl names for the tree as "olcagüite," "ulcuagüil," "olcuahuitl," and "ulcuahuitl."

This is one of the best-known trees of Mexico, being the principal source of commercial rubber in Mexico and Central America. The rubber is obtained from either wild or cultivated trees. The *Castilla* grows wild chiefly in the states of Chiapas, Tabasco, Yucatán, and Veracruz, usually at altitudes of 700 meters or less. It is reported also from Campeche, Oaxaca, Guerrero, Michoacán, Colima, Jalisco, Hidalgo, Sinaloa, and Tamaulipas. Cultivation of the rubber tree was begun in the State of Chiapas about 50 years ago, but only in an experimental way, and it is only in recent years that cultivation has been carried on upon an extensive scale. The details of rubber production are so numerous that they can not be treated here, but those interested in the subject should consult the paper by Cook, listed above.

Like other plants of the family Moraceae, the rubber tree has milky juice, and this is the source of the rubber. The juice is obtained by tapping the trees. It coagulates upon exposure to the air, but various substances are sometimes added to hasten coagulation. In British Honduras the pounded stems of morning-glory (*Calonyction*) are said to be used for this purpose. The early inhabitants of Mexico were well acquainted with the crude rubber, using it to make balls for games, for bottles, and for waterproofing coats, hats, shoes, and other objects.

The wood is white and moderately heavy. The bark is beaten out by some of the Indians of tropical America, and the fabric thus obtained is used for clothing and blankets. In Mexico the bark is said to have been one of the sources of paper.

Hernández was probably the first to give an account of the Mexican rubber tree. He gives a fairly accurate figure,[1] and the following account, in a chapter entitled "De Holquahuitl, seu Arbore Chilli[2]": "*Holquahuitl* is a tree of which there are two sorts. The one produces a large, smooth, yellow stem, full of soft pith; whitish flowers; very large leaves; and star-shaped disks, pale but becoming red, clinging to a stalk and crowded with fruits like Pontic nuts, which are covered with a whitish and yellow skin and have a bitter flavor. The other sort has leaves like *Malus Medicus*, but larger; the bark of both trees is bitter. The latter grows in Michoacán, where it is called *tarantaquam*. The first is called *Mecatlani* and *yhulapae*. The bark is warm in the third order and slightly lubricous; its infused decoction is good for dysentery. When cut it yields a gum, called *Holli* by the Indians, which is at first milky, but soon yellow, and finally black, if it is smeared on the bodies of those who gather it. It is so resilient that balls fashioned from it bounce like hand-balls, and it is useful for many other purposes. For it evokes the urine uncommonly, cleanses the womb, and corrects sterility. * * * Added to food it fattens, and compounded with those creatures which are called *Axin*, it is said to engender a certain agility to the body, and to soften the bones so that men are able to

[1] Thesaurus 50. 1651.

[2] The word "chilli" is probably a typographical error for "holli" or "hule."

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turn and twist this way and that, and to handle the body like contortionists; and it excites venery, it allays colics, applied as a plaster it relieves the bowels, appeases thirst, and, burnt, it dissipates ulcers. This is that noble gum with which the Indians once were wont to play the game called *Bathei*, wonderful to see, which, by the agency of Cortés, the people of Spain also were enabled to witness years ago. The leaves of the tree, dried and bruised, are said to destroy lions and other animals."

According to Sahagún, "hoarseness is cured by rubbing the throat with *ulli*, drinking honey, and sniffing a few drops of honey up the nose. * * * The gum is very medicinal and is used for almost all diseases. It is a remedy for the eyes, for abscesses, and for suppuration. It is taken with cacao. It is useful for the stomach and intestines, internal putrefaction, and constipation." The rubber was employed also for holding broken bones in place, and for similar purposes.

Several other species of *Castilla* are found in Central America. Some Mexican specimens have been reported as *C. guatemalensis* Pittier,[1] but the present writer has no reason for believing that more than one species occurs in Mexico.

8. SAHAGUNIA[2] Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 316. 1851.

1. **Sahagunia mexicana** Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 316. 1851.

Mirador and Barranca de Santa María, Veracruz.

Tree; leaves oblong, acuminate, entire or nearly so; flowers dioecious, the staminate spicate, the pistillate capitate. "Arbol del pan" (Veracruz, *Villada*).

9. CECROPIA L. Amoen. Acad. 5: 410. 1760.

REFERENCE: Miquel in Mart. Fl. Bras. 4[1]: 139–154. 1853.

Trees or shrubs, the stems simple or branched, the trunk whitish, hollow; leaves long-petiolate, the blades deeply lobed, usually white-tomentose beneath, the lobes 7 to 13, entire; stipules large, inclosing the young inflorescences; flowers dioecious, in very dense cylindric spikes, these clustered at the end of a stout peduncle.

All the species are much alike in general appearance, and they are not easily separated upon examination of herbarium material. The specimens available are

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[1] Contr. U. S. Nat. Herb. 13: 272. 1910. The proper name for this species is *Castilla gummifera* (Bertol.) Pittier; see Contr. U. S. Nat. Herb. 20: 34. 1917.

[2] The genus is named in honor of Bernardo de Sahagún, a Franciscan friar of Spanish birth who came to Mexico as a missionary in 1529. Here, as Prescott states, "he distinguished himself by his zeal, the purity of his life, and his unwearied exertions to spread the great truths of religion among the natives." He wrote a "Historia Universal de Nueva España," the material for which he obtained directly from the native people with whom he was continually associated. This work he composed in the Nahuatl language, which he could both write and speak with great fluency. It was feared by the other members of the order that the publication of the work would keep alive in the natives too vivid an impression of the superstitions which it was the duty of the Christian church to eradicate, and consequently the permission to print the manuscript was refused. It was not until 1830 that Sahagún's history was actually printed. Besides the other matters of which it treats, the book contains much information regarding the plants of Mexico. Sahagún's work is one of the most important of those dealing with Mexican antiquities, and is unique in the method of its preparation. The author lived to an advanced age, and died in the capital in 1590.

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not numerous or very satisfactory, and it is doubtful how many species occur in Mexico.

The trees grow very rapidly. Their hollow trunks are generally inhabited by pugnacious ants. The trunks are often cut in two and used as troughs to conduct water. Many of the native inhabitants of tropical America used them also for making a kind of trumpet, and the soft spongy wood was employed as tinder. In Brazil the wood has been used for making paper. The bark contains a tough, coarse fiber used for cordage and for mats and for a kind of coarse cloth by the Indians of Central and South America. The sap yields rubber, but the quantity obtained by tapping is too small to be of commercial importance. It is said that the Indians sometimes ate the pith and that cattle eat the leaves and fruit. The fruit is eaten also by birds.

Various medicinal properties are ascribed to the plants. In Mexico the juice is used as a caustic for the treatment of ulcers and the removal of warts. In South America and the West Indies it is used for dysentery and venereal diseases, and a decoction of the young leaves for dropsy, liver affections, and asthma. The ashes, according to Barham, were employed as a remedy for dropsy. It is said, in addition, that the plant possesses the properties of digitalis, although its toxicity is relatively low.

According to Cook[1] *Cecropia peltata* is known in Porto Rico as "yagrumo hembra," because of the fact that it is popularly believed to be the female plant of *Didymopanax morototoni*, which is known as "yagrumo macho."

The trees of the genus *Cecropia* are first described by Oviedo[2] (Lib. VIII, Cap. X), under the name "yaruma." He states that the Indians valued them highly as a remedy for wounds.

The following vernacular names are reported for the species: "Guarumbo" (Valley of Mexico, Oaxaca, Tabasco, Chiapas); "guarumo" (Tabasco, Chiapas, Veracruz, Costa Rica; the word, according to Pittier, is probably of Cuban or Haitian origin); "chancarro" (Veracruz, Oaxaca); "coilotópalo," "coilotápalo" (Valley of Mexico); "saruma" (Michoacán, Valley of Mexico); "guarima" (Tabasco, Chiapas).

Pistillate spikes sessile ..... 1. C. mexicana.
Pistillate spikes pedunculate.
  Staminate spikes few, 10 to 15 cm. long ..... 2. C. schiedeana.
  Staminate spikes numerous (12 to 15), 3 to 6 cm. long ..... 3. C. obtusa.

1. **Cecropia mexicana** Hemsl. Biol. Centr. Amer. Bot. 3: 151. *pl. 80.* 1883.

Veracruz to Sinaloa and Oaxaca; type from Córdoba, Veracruz. Central America.

Sometimes as much as 12 to 15 meters high. "Guarumbo" (Oaxaca); "trompeta" (Sinaloa); "guarumo" (Costa Rica, El Salvador).

This is probably the species reported from Jorullo by Sessé and Mociño[3] as *C. peltata* L. It has often been reported from Mexico under that name by other writers. One collection from Oaxaca, with leaves glabrate beneath, perhaps represents an undescribed species.

2. **Cecropia schiedeana** Klotzsch, Linnaea 20: 531. 1847.

Veracruz; type from Papantla.

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[1] Contr. U. S. Nat. Herb. 8: 110. 1903.

[2] Primera parte de la historia natural y general de las Indias, yslas y tierra firme del mar oceano. Sevilla, 1535. An enlarged and improved edition was published in Madrid, 1851-55.

[3] Pl. Nov. Hisp. 170. 1887.

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3. Cecropia obtusa Trécul, Ann. Sci. Nat. III. **8**: 79. 1849.

Veracruz and Yucatán. Cuba; South America.

"Xcoochlé" (Yucatán, Maya); "yagrumo hembra" (Cuba).

DOUBTFUL SPECIES.

CECROPIA COMMUTATA Schott; Miquel in Mart. Fl. Bras. 4^1: 148. 1843. Described from a sterile cultivated plant said to be of Mexican origin.

CECROPIA PROPINQUA Miquel in Mart. Fl. Bras. 4^1: 149. 1843. Described from sterile cultivated plants.

10. COUSSAPOA Aubl. Pl. Guian. 2: 891. 1775.

1. Coussapoa rekoi Standl. Contr. U. S. Nat. Herb. **20**: 211. 1919.

Veracruz and Oaxaca; type locality, Cafetal Concordia, Cerro Espino, Oaxaca, at an altitude of 600 meters.

Large tree with spreading crown, the branchlets, stipules, and nerves prickly; leaves ovate-rounded, sometimes half a meter long, entire, short-pointed; flowers in globose pedunculate heads, the head becoming succulent and edible at maturity. "Chirimoya," "carnero" (Oaxaca); "ababábite" (Veracruz).

The ripe heads are edible; they are about 2.5 cm. in diameter and resemble miniature chirimoyas (*Annona cherimola*). Mr. Wilson Popenoe has found them recently offered for sale in markets of Veracruz.

25. URTICACEAE. Nettle Family.

Large or small shrubs or small trees, sometimes covered with stinging hairs. Many herbaceous representatives of the family occur in Mexico. Most of the species of the Urticaceae have very tough stems, from which coarse, tough fiber may be obtained.

Plants with stinging hairs.
- Stigma penicillate-capitate; perianth lobes fleshy in fruit ..... 1. **URERA.**
- Stigma filiform; perianth lobes unchanged in fruit ..... 2. **URTICASTRUM.**

Plants never with stinging hairs.
- Perianth membranaceous in fruit, inclosing the achene.
  - Stigma persistent; leaves toothed ..... 3. **BOEHMERIA.**
  - Stigma deciduous; leaves entire ..... 4. **POUZOLZIA.**
- Perianth none.
  - Flowers in long slender spikes ..... 5. **MYRIOCARPA.**
  - Flowers in axillary glomerules ..... 6. **PHENAX.**

1. URERA Gaud. in Freyc. Voy. Bot. 496. 1826.

REFERENCE: Weddell in DC. Prodr. 16^1: 88–98. 1869.

Trees or shrubs, covered with stinging hairs; leaves alternate, stipulate, petioled; flowers small, green, in axillary panicles, usually dioecious; fruit a small achene, surrounded by the fleshy calyx and resembling a berry.

Inflorescence not dichotomous; leaves entire or sinuate. Achene exceeding the calyx ..... 1. **U. microcarpa.**

Inflorescence dichotomous or trichotomous; leaves crenate-dentate or coarsely dentate.
- Achene exceeding the calyx; leaves coarsely dentate ..... 2. **U. baccifera.**
- Achene not exceeding the calyx; leaves closely crenate-dentate. 3. **U. caracasana.**

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1. **Urera microcarpa** Wedd. Arch. Mus. Paris 9: 156. 1856.

Yucatán and Tabasco. Panama; Jamaica (type locality).

Shrub or small tree; leaves elliptic-oblong, 7 to 10 cm. long. "Laol" (Yucatán, Maya).

2. **Urera baccifera** (L.) Gaud. in Freyc. Voy. Bot. 497. 1826.

Urtica baccifera L. Sp. Pl. ed. 2. 1398. 1763.

Oaxaca; reported from Yucatán, and probably also in Tabasco or Chiapas. Central America, West Indies, and South America.

Shrub or small tree, 2 to 7 meters high, covered with stout stinging hairs; leaves oval or rounded-cordate, 10 to 30 cm. long or larger; flowers small, in cymes, whitish, the branches of the cymes red or purplish; fruit small, juicy, white. "Ortiga de caballo" (Yucatán); "chichicastle" (Oaxaca); "chichicazte" (Guatemala); "chichicazte nigua" (El Salvador); "ortiga" (Panama, Porto Rico); "ortiga brava" (Porto Rico); "pringamosa" or "pringamoza" (Colombia, Santo Domingo, Venezuela); "guaina" (Colombia); "chichicate," "chichicastre" (Cuba).

The fruit is said to be edible. In Yucatán the shrub is planted for hedges. The hairs sting the flesh severely and sometimes cause painful sores. The branches are said to be used sometimes in Colombia as a rubefacient, and the fiber separated from them is employed in Cuba and elsewhere for making rope and twine. According to Grosourdy,[1] the root has been used in Porto Rico as a popular remedy for gonorrhoea, and the juice of the leaves for chills in intermittent fevers, while diuretic properties are ascribed to the plant.

3. **Urera caracasana** (Jacq.) Griseb. Fl. Brit. W. Ind. 154. 1859.

Urtica caracasana Jacq. Pl. Hort. Schönbr. 3: 71. *pl. 386.* 1798.

Urera caracasana tomentosa Wedd. in DC. Prodr. 16[1]: 90. 1869.

Urtica chichicaztli Sessé & Moc. Pl. Nov. Hisp. 160. 1887.

Veracruz to Sinaloa, Chiapas, and Tabasco. Central America, West Indies, and tropical South America; type from Caracas, Venezuela.

Shrub or small tree, 2 to 4 meters high, usually armed with slender stinging hairs; leaves very variable in shape, rounded-ovate to rhombic-elliptic, cordate to obtuse at base, acute or acuminate at apex, sparsely or densely pubescent; flowers very small, greenish; fruit bright red at maturity. "Ortiga" (Veracruz, Tabasco); "mal hombre" (Veracruz); "quemador" (Sinaloa); "chichicazlillo" (Oaxaca); "chichicaxtli," "mala mujer" (Morelos, *Sessé & Mociño*); "tachinole" (Durango); "chichicaste" (Guatemala); "ortiga colorada" (Porto Rico).

According to Reko, the Nahuatl name is "xio-patli" (*xioti*, syphilis; *patli*, remedy, medicine). He states that the plant is still used by the Indians of the Sierra de Juárez as a remedy for syphilis. Sessé and Mociño state that the shrub was sometimes planted for hedges. Palmer reports that in Durango it is employed to cure the effects of poison ivy (*Rhus toxicodendron* and related species).

2. URTICASTRUM Fabr. Pl. Hort. Helmst. 204. 1759.

1. **Urticastrum mexicanum** (Liebm.) Kuntze, Rev. Gen. Pl. 1: 635. 1891.

Discocarpus mexicanus Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 309. 1851.

Urera platycarpa Wedd. Ann. Sci. Nat. III. 18: 202. 1852.

Laportea mexicana Wedd. in DC. Prodr. 16[1]: 84. 1879.

Veracruz and Oaxaca (type locality). Guatemala.

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[1] René de Grosourdy, El médico botánico criollo. 1864.

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Shrub, 1 to 3 meters high, covered with slender stinging hairs, the trunk thick, succulent, sparsely branched; leaves broadly ovate, crenate; flowers dioecious; fruit a small thin orbicular achene.

3. BOEHMERIA Jacq. Enum. Pl. Carib. 9. 1760.

REFERENCE: Weddell in DC. Prodr. 16 [1]: 195–218. 1869.

Shrubs or more commonly herbs; leaves opposite or alternate, 3-nerved; flowers green, unisexual, panicled, glomerate, or spicate in the leaf axils; fruit a small achene.

A few herbaceous species occur in Mexico besides those listed below. The best-known species of the genus is the ramie plant ("ramié," "seda vegetal"), *Boehmeria nivea* (L.) Gaud., a large herb or small shrub which has been cultivated in Mexico as well as elsewhere for its fiber. It differs from the native Mexican species in having the leaves densely white-tomentose beneath. The original home of the plant was probably China, but the species is now widely dispersed in tropical regions.

Flowers in dense axillary glomerules ..... 1. B. ulmifolia.
Flowers in long dense spikes.
Stipules lance-ovate; leaves copiously pubescent on the upper surface. ..... 2. B. caudata.
Stipules lance-linear; leaves glabrate on the upper surface ..... 3. B. palmeri.

1. **Boehmeria ulmifolia** Wedd. Arch. Mus. Paris 9: 347. 1856.
Boehmeria fallax ulmifolia Wedd. in DC. Prodr. 16 [1]: 198. 1869.
Veracruz; type from Jalapa. Guatemala.
Shrub, 1. 5 to 2.5 meters high; leaves broadly ovate, crenate.

2. **Boehmeria caudata** Swartz, Prodr. Veg. Ind. Occ. 34. 1788.
Boehmeria flagelliformis Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 310. 1851.
Veracruz to Oaxaca. Central America, West Indies, and tropical South America.
Shrub or small tree, 2 to 5 meters high; leaves ovate or lance-elliptic, closely crenate, densely pubescent beneath.
The plant is said to give a very strong fiber. This is probably the plant described by Sessé and Mociño [1] as *Urtica spicata*. That name belongs properly to an Old World species of *Boehmeria*.

3. **Boehmeria palmeri** S. Wats. Proc. Amer. Acad. 22: 453. 1887.
Known only from the type locality, Tequila, Jalisco.
Shrub, 2.5 meters high; leaves ovate, 7 to 13 cm. long; flower spikes often leafy at the apex.

4. POUZOLZIA Gaud. in Freyc. Voy. Bot. 503. 1826.

Shrubs; leaves usually alternate, 3-nerved, stipulate; flowers monoecious, clustered in the leaf axils, the glomerules unisexual; fruit a small achene.

Leaves densely short-pilose beneath, not tomentose ..... 1. P. palmeri.
Leaves densely white-tomentose beneath.
Leaves mostly 4 to 7 cm. long, abruptly acuminate ..... 2. P. nivea.
Leaves mostly 1.5 to 4 cm. long, rounded to acute at the apex ..... 3. P. pringlei.

1. **Pouzolzia palmeri** S. Wats. Proc. Amer. Acad. 22: 453. 1887.
Rocky slopes of barrancas, Jalisco and Sinaloa to Morelos; type from Guadalajara.
Shrub, 1 to 1.5 meters high, with slender reddish brown branches; leaves bright green, ovate or oval, acuminate; flowers very small, in dense axillary clusters.

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[1] Fl. Mex. 235. 1896.

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2. **Pouzolzia nivea** S. Wats. Proc. Amer. Acad. 22: 453. 1887.

Rocky slopes, Jalisco and Sinaloa to Veracruz; type from Guadalajara.

Shrub, 1 to 1.5 meters high; leaves ovate or oval, 3-nerved, very white beneath.

P. latifolia Wedd.[1] was based on specimens said to have come from Mexico. Its description suggests *P. nivea*.

3. **Pouzolzia pringlei** Greenm. Proc. Amer. Acad. 33: 476. 1998.

Puebla and Oaxaca; type from Tomellín Canyon, Oaxaca.

Shrub similar to the last species but with much smaller leaves.

5. MYRIOCARPA Benth. Bot. Voy. Sulph. 168. 1844.

REFERENCE: Weddell in DC. Prodr. 16[1]: 235[33]–235[36]. 1869.

Trees or shrubs; leaves large, alternate, dentate, pinnately veined and somewhat 3-nerved; stipules connate; flowers green, dioecious, the long stalks axillary, solitary or clustered; fruit a small achene.

Leaf blades ovate-orbicular, cordate at the base.....1. **M. cordifolia.**
Leaf blades ovate or broadly ovate, obtuse or rounded or rarely subcordate at the base.
Leaves serrate; pistillate peduncles slender, glabrate.....2. **M. longipes.**
Leaves crenate; pistillate peduncles stout, densely pilose.3. **M. brachystachys.**

1. **Myriocarpa cordifolia** Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 306. 1851.

Veracruz and Puebla; type from forests near Colipa, Veracruz.

Tree, 4 to 5 meters high; leaves mostly 20 to 25 cm. long and nearly as wide; fruit a small achene. "Mal hombre" (Puebla).

2. **Myriocarpa longipes** Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 306. 1851.

Myriocarpa colipensis Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 306. 1851.

Veracruz to Colima and Chiapas. Central America; type from Costa Rica.

Shrub, 2.5 to 6 meters high; flowers in very long slender spikes. "Cholagogue Indio" (Oaxaca).

The plant is sometimes used for hedges. In Oaxaca it is employed as a remedy for malaria.

3. **Myriocarpa brachystachys** S. Wats. Proc. Amer. Acad. 26: 152. 1891.

Jalisco; type from barranca near Guadalajara.

Shrub or small tree; leaves 7 to 17 cm. long, densely pubescent beneath.

Myriocarpa stipitata ambigua Wedd.,[2] described from Veracruz, is perhaps the same as *M. longipes*.

6. PHENAX Wedd. Ann. Sci. Nat. IV. 1: 191. 1854.

Shrubs; leaves alternate, petiolate, toothed, 3 or 5-nerved; stipules free; flowers green, monoecious, in dense axillary clusters, the bracts brown, scarious; fruit a compressed achene.

Leaf blades broadly ovate, thin, coarsely crenate.....1. **P. hirtus.**
Leaf blades ovate to lance-oblong, thick, finely and closely crenate.
2. **P. mexicanus.**

1. **Phenax hirtus** (Swartz) Wedd. in DC. Prodr. 16[1]: 235[38]. 1869.

Urtica hirta Swartz, Fl. Ind. Occ. 1: 285. 1797.

Veracruz to Oaxaca. Central America, West Indies, and tropical South America.

Shrub, 1 to 2 meters high; leaves mostly 5 to 11 cm. long, green, glabrate, long-petiolate, coarsely crenate.

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[1] In DC. Prodr. 16[1]: 234. 1869. [2] In DC. Prodr. 16[1]: 235[34]. 1879.

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Specimens reported from Jalapa by Hemsley[1] as *P. sonneratii* Wedd. probably belong here.

2. **Phenax mexicanus** Wedd. Arch. Mus. Paris **9**: 500. 1856.
Phenax gaudichaudianus Wedd. Ann. Sci. Nat. IV. **1**: 193. 1854.
Phenax galeottianus Blume, Mus. Bot. Lugd. Bat. **2**: 227. 1866.
Veracruz, Oaxaca, and Chiapas. Central America.
Shrub, 1 to 2.5 meters high; leaves bright green, 3-nerved; flowers small, in dense axillary clusters; fruit a small achene.

26. PROTEACEAE. Protea Family.

1. ROUPALA Aubl. Pl. Guian. 1: 83. 1775.

1. **Roupala borealis** Hemsl. Biol. Centr. Amer. Bot. **3**: 78. *pl. 76.* 1882.
Veracruz and Oaxaca; type from San Cristóbal, Veracruz. Guatemala.
Shrub or small tree, nearly glabrous; leaves dimorphous, part of them pinnate, with coarsely serrate leaflets, part of them simple, long-petiolate, ovate or elliptic, long-acuminate, shallowly serrate; flowers small, in long slender spikes. "Palo de zorrillo" (Oaxaca).

27. LORANTHACEAE. Mistletoe Family.

Shrubs, sometimes very small, parasitic upon the branches of trees or shrubs, usually green but often red, brown, or yellowish and without chlorophyll; leaves mostly opposite, entire, thick and leathery, frequently reduced to scales, estipulate; flowers large or small, perfect or unisexual; fruit a 1-seeded berry.

The pulp of the fruit is extremely viscid, and if it comes in contact with any object it can not be separated from it without great difficulty. The fruit is eaten by birds and it is largely by their agency that the seeds are transported from one host to another. It is said that in Brazil a kind of rubber has been extracted from the fruit, and that the leaves are used for tanning.

When one of the plants of this family is removed from its host there is exposed upon the latter a curious structure which often assumes a flower-like form. These "wood flowers" or "flores de madera" are well known in some parts of tropical America, and various superstitions are associated with them.

Flowers not calyculate, very small.
- Flowers in one rank on the joints of the inflorescence. Leaves developed. **1. DENDROPHTHORA.**
- Flowers in 2 or more ranks.
  - Flowers solitary in the axils of the bracts; leaves reduced to scales. **2. RAZOUMOFSKYA.**
  - Flowers borne above the bracts on the axis of the spike; leaves often well developed ..... **3. PHORADENDRON.**

Flowers calyculate, often large and showy.
- Flowers sunk in the axis of the inflorescence ..... **4. ORYCTANTHUS.**
- Flowers not sunk in the axis of the inflorescence, sessile or pedicellate.
  - Flowers small, less than 1 cm. long ..... **5. STRUTHANTHUS.**
  - Flowers large, 2 cm. long or larger.
    - Seeds with endosperm ..... **6. PHRYGILANTHUS.**
    - Seeds without endosperm ..... **7. PSITTACANTHUS.**

[1] Biol. Centr. Amer. Bot. **3**: 161. 1883.

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1. DENDROPHTHORA Eichl. in Mart. Fl. Bras. 5 [2]: 102. 1868.

1. **Dendrophthora pedicellata** Van Tiegh. Bull. Soc. Bot. France 43: 182. 1896.
Type from "Mesa Chica."

Stems terete; leaves oblong or oblong-lanceolate, 3.5 to 5 cm. long, obtuse or rounded at apex, glabrous; spikes 1 cm. long, 2 or 3-jointed, the flowers pedicellate.

2. RAZOUMOFSKYA Hoffm. Hort. Mosq. 1808.

1. **Razoumofskya vaginata** (H. B. K.) Kuntze, Rev. Gen. Pl. 1: 587. 1891.
Viscum vaginatum H. B. K. Nov. Gen. & Sp. 3: 445. 1817.
Arceuthobium cryptopodum Engelm. Bost. Journ. Nat. Hist. 6: 214. 1850.
Arceuthobium vaginatum Eichl. in Mart. Fl. Bras. 5[2]: 105. 1868.

Sonora to Coahuila, Mexico, and Oaxaca; type from Cofre de Perote. Western United States. On pines; reported also on *Abies religiosa*.

Plants 6 to 20 cm. high, often forming dense tufts, much branched, brownish; leaves reduced to small scales; flowers spicate. "Ingerto" (Durango).

Hemsley [1] reports *A. campylopodum* Engelm. from Orizaba and *A. oxycedri* Bieb. from Veracruz and Oaxaca. It may be that more than one species is represented in the material examined by the writer, but there are no readily apparent characters for their separation.

3. PHORADENDRON Nutt. Journ. Acad. Phila. II. 1: 185. 1847.

REFERENCE: Trelease, The genus *Phoradendron*, pp. 1–124, *pl. 1–245*. 1916.

Branches terete, angulate, or compressed; leaves opposite, sometimes reduced to scales; flowers usually dioecious, sessile or immersed in the rachis of a spike.

Mistletoe plants are much used in the United States for Christmas decorations, and on this account are of some commercial importance. The American mistletoes are different from the true mistletoe of Europe, *Viscum album* L., but some of them are similar to it in general appearance. The Spanish names applied to the European mistletoe are "muérdago," "liga," and "visco," words adopted in Spanish America for the native plants of the same family. The species of *Phoradendron* often occur upon trees in such abundance as ultimately to kill them. The fruit of some species has been reported as poisonous, but that of other species is said to be edible. The species apparently are little used in domestic medicine. The Coahuilla Indians of southern California are said to use the dried and powdered stems of one species (growing on *Juniperus*) as a remedy for saddle sores on horses. Ramírez gives the names applied to various species of doubtful identification as "cabellera," "liga," "visco cuercino," and "chachahua."

Stems with scales near the base of the branches; leaves always developed.
- Scales present on all the joints ..... 1. P. piperoides.
- Scales present only on the basal joints of the branches.
  - Leaves pinnately nerved, oval or oblong-oval ..... 2. P. oliverianum.
  - Leaves palmately nerved.
    - Flowers mostly 2-ranked on each joint.
      - Stems quadrangular.
        - Fruit not tuberculate; leaves twice as long as broad ..... 3. P. townsendi.
        - Fruit tuberculate; leaves nearly as broad as long ..... 4. P. yucatanum.
      - Stems not quadrangular.
        - Spikes filiform; branchlets compressed ..... 5. P. wawrae.
        - Spikes stout; branchlets subterete ..... 6. P. vernicosum.

[1] Biol. Centr. Amer. Bot. 3: 83–4. 1882.

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Flowers 4 to 6-ranked.
Fruit tuberculate.
Leaves 15 to 30 mm. wide ..... **7. P. amplifolium.**
Leaves 4 to 8 mm. wide ..... **8. P. carneum.**
Fruit not tuberculate.
Branches sharply quadrangular.
Sepals closely meeting in fruit.
Spikes pedunculate ..... **9. P. tamaulipense.**
Spikes sessile ..... **10. P. gaumeri.**
Sepals not meeting in fruit.
Leaves subsessile ..... **11. P. guazumae.**
Leaves petiolate ..... **12. P. commutatum.**
Branches terete or compressed.
Leaves small, 10 to 12 mm. long ..... **13. P. brevifolium.**
Leaves large, 3 cm. long or usually much larger.
Leaves thin, sharply nerved.
Leaf blades ovate-oval ..... **14. P. pachyarthron.**
Leaf blades ovate-lanceolate to lance-linear.
Branchlets subterete ..... **15. P. schumanni.**
Branchlets compressed.
Bracts usually 2 pairs ..... **16. P. purpusi.**
Bracts a single pair ..... **17. P. nervosum.**
Leaves very thick and coriaceous.
Leaf blades oval-ovate ..... **18. P. reichenbachianum.**
Leaf blades lanceolate to linear.
Fruit ovoid.
Branchlets compressed; nerves coarse. **19. P. lanceolatum.**
Branchlets not compressed; nerves slender. **20. P. falcatum.**
Fruit globose ..... **21. P. forestierae.**
Stems without scales on the branches; leaves sometimes reduced to scales.
Branches broadly winged ..... **22. P. calyculatum.**
Branches not winged.
Pistillate flowers 2 to each joint. Plants parasitic chiefly on Pinaceae.
Leaves reduced to small scales, not disarticulating.
Plants puberulent; spikes several-jointed ..... **23. P. californicum.**
Plants glabrous; spikes 1-jointed.
Scales strongly constricted at the base. On *Juniperus*. **24. P. ligatum.**
Scales obscurely or not at all constricted.
Scales not constricted; plants stout, on *Juniperus*. **25. P. juniperinum.**
Scales obscurely constricted; plants slender, pendent, on *Libocedrus* ..... **26. P. libocedri.**
Leaves well developed or sometimes scalelike but disarticulating.
Leaves scalelike ..... **27. P. minutifolium.**
Leaves well developed.
Leaves linear or linear-oblong.
Plants tomentose; spikes often with 2 or 3 joints. **28. P. capitellatum.**
Plants papillose or hirtellous; spikes usually with one joint.
Staminate spikes about 12-flowered ..... **29. P. tequilense.**
Staminate spikes about 6-flowered ..... **30. P. saltillense.**

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Leaves more or less spatulate.
Leaves spatulate-linear.....31. P. bolleanum.
Leaves oblanceolate-spatulate.
Spikes usually 2-jointed; staminate spikes mostly 6-flowered. 32. P. guadalupense.
Spikes usually 1-jointed; staminate spikes 8 to 12-flowered.
Staminate spikes about 12-flowered; on *Juniperus*. 33. P. densum.
Staminate spikes about 8-flowered; on *Abies* and *Cupressus*. 34. P. pauciflorum.

Pistillate flowers 6 or more on each joint.
Branches compressed at the joints.
Leaves 10 to 25 mm. wide.....35. P. scaberrimum.
Leaves 5 to 7 mm. wide.....36. P. longifolium.
Branches not compressed.
Leaves mostly acute or attenuate, large (mostly 7 to 10 cm. long), pubescent.....37. P. velutinum.
Leaves rounded or very obtuse at the apex, or if acute very small.
Leaves small, usually 1 cm. wide or less, if larger very long in proportion to their breadth.
Plants persistently tomentose.....38. P. lanatum.
Plants not persistently tomentose, the pubescence sparse or soon deciduous.
Fruit villous or hispid.
Leaves oval or elliptic.....39. P. eduardi.
Leaves linear-oblanceolate to narrowly oblong.
Fruit retrorsely hispid. Sepals closed.....40. P. galeottii.
Fruit sparsely villous.
Sepals closed.....41. P. peninsulare.
Sepals open.....42. P. palmeri.
Fruit glabrous or puberulent.
Leaves subacute, sessile.....43. P. mazatlanum.
Leaves very obtuse, usually petiolate.
Plants large, stout.
Leaves sessile.....44. P. globuliferum.
Leaves petiolate.
Plants glabrate.....45. P. brachystachyum.
Plants densely pubescent throughout. 46. P. tlacolulense.
Plants small (of Baja California).
Leaves oval or rounded.....47. P. aureum.
Leaves oblong or obovate-oblong.....48. P. diguetii.
Leaves large, most of them 2 cm. wide or larger, never much elongate.
Fruit pubescent.
Leaf blades mostly 5 to 8 cm. long.....49. P. robinsoni.
Leaf blades usually less than 4 cm. long.
Leaves orbicular or nearly so.....50. P. coryae.
Leaves elliptic or obovate.....51. P. tomentosum.
Fruit glabrous.
Spikes yellow-hispid.....52. P. colipense.
Spikes glabrous, tomentose, or sparsely villous.
Spikes glabrous or sparsely villous.
Leaves suborbicular.....53. P. macrophyllum.
Leaves rounded-obovate.....54. P. cockerellii.

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Spikes canescent-tomentose.
Staminate spikes 4 to 6 cm. long.....55. P. greggii.
Staminate spikes 2 cm. long or shorter.
Staminate spikes (in flower) 1.5 to 2 cm. long.
56. P. engelmanni.
Staminate spikes 1 cm. long.....57. P. thyrsoideum.

1. **Phoradendron piperoides** (H. B. K.) Trel. Gen. Phorad. 145. 1916.
Viscum latifolium Swartz, Fl. Ind. Occ. 1: 268. 1797. Not *V. latifolium* Lam. 1789.
Loranthus piperoides H. B. K. Nov. Gen. & Sp. 3: 443. 1818.
Viscum cornifolium Presl, Epim. Bot. 254. 1849.
Viscum ellipticum Presl, Epim. Bot. 254. 1849.
Viscum laurifolium Presl, Epim. Bot. 255. 1849.
Veracruz. Central America, West Indies, and South America; type from Popayán, Colombia. On various dicotyledonous hosts.
Leaves lanceolate to broadly ovate, 6 to 10 cm. long, acute or acuminate; fruit yellow or orange.

2. **Phoradendron oliverianum** Trel. Gen. Phorad. 136. *pl. 201.* 1916.
Veracruz; type from Mirador.
Leaves oval or elliptic, 4.5 to 6 cm. long, obtuse or rounded at the apex; spikes 2 to 3.5 cm. long.

3. **Phoradendron townsendi** Trel. Gen. Phorad. 112. *pl. 162.* 1916.
Known only from Socorro Island.
Leaves oblanceolate-oblong, 4 to 6 cm. long, very obtuse; spikes 1 cm. long.

4. **Phoradendron yucatanum** Trel. Gen. Phorad. 118. *pl. 173.* 1916.
Yucatán.
Leaves cuneately obovate or suborbicular, 1.5 to 2.5 cm. long, rounded or emarginate at the apex; spikes 5 to 10 mm. long.

5. **Phoradendron wawrae** Trel. Gen. Phorad. 94. *pl. 128.* 1916.
Veracruz; type from Tuxpan.
Leaves lanceolate or oblanceolate, 5 to 10 cm. long, very obtuse; spikes 1 to 1.5 cm. long.

6. **Phoradendron vernicosum** Greenm. Field Mus. Bot. 2: 250, 1897.
Yucatán, the type from Izamal; parasitic on *Bumelia buxifolia* and perhaps on other plants.
Leaves elliptic, obovate, or lanceolate, 2.5 to 4 cm. long, very obtuse; spikes 1 to 2 cm. long.

7. **Phoradendron amplifolium** Trel. Gen. Phorad. 59. *pl. 68.* 1916.
Veracruz, Puebla, and Oaxaca; type collected between Piaxtla and Amolac, Puebla.
Leaves oblanceolate-oblong to obovate-elliptic, very obtuse, 8 to 12 cm. long; spikes 3 cm. long; fruit reddish, 6 to 7 mm. in diameter.

8. **Phoradendron carneum** Urban, Bot. Jahrb. Engler 23: Beibl. 5: 1. 1897.
Jalisco to Querétaro and Oaxaca; type from Guadalajara; on *Ipomoea* and *Populus*.
Leaves linear-lanceolate, obtuse or acute, 5 to 15 cm. long; spikes 2 to 3 cm. long; fruit reddish orange, 4 to 5 mm. in diameter.

9. **Phoradendron tamaulipense** Trel. Gen. Phorad. 115. *pl. 167.* 1916.
Tamaulipas, Veracruz, and Oaxaca; type from Alvarado, Veracruz; on *Salix*, *Populus*, *Mimosa*, and *Parmentiera*.

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Leaves elliptic-obovate, obtuse, 3.5 to 5 cm. long, subsessile; spikes 1.5 to 5 cm. long; fruit coral-red or deep orange. "Ingerto,"[1] "seca-palo" (Tamaulipas).

In Tamaulipas the plant is used with "chile color" (*Capsicum*) to make an ointment applied for the relief of pain.

10. **Phoradendron gaumeri** Trel. Gen. Phorad. 114. *pl. 167.* 1916.

Known only from the type locality, Izamal, Yucatán.

Leaves elliptic-obovate, obtuse, 2.5 to 3 cm. long; spikes 2 to 4 cm. long.

11. **Phoradendron guazumae** Trel. Gen. Phorad. 104. *pl. 148.* 1916.

Sinaloa; type from Mazatlán; on *Guazuma.*

Leaves oblanceolate or obovate, 4 to 5.5 cm. long, very obtuse; spikes 1 to 2 cm. long.

12. **Phoradendron commutatum** Trel. Gen. Phorad. 106. *pl. 150, 151.* 1916.

Sinaloa to San Luis Potosí and Tabasco; type collected between Guadalajara and Tepic. Honduras and Nicaragua.

Leaves obovate, 3.5 to 5 cm. long, obtuse or acute; spikes 1.5 to 3 cm. long; fruit red. "Cabellera" (Tabasco).

13. **Phoradendron brevifolium** Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 176. 1864.

Puebla and Oaxaca; type from Tehuacán, Puebla.

Leaves narrowly elliptic or oblong, 3 mm. wide, very obtuse, sessile; spikes 5 cm. long or shorter.

14. **Phoradendron pachyarthron** Eichl. in Mart. Fl. Bras. 5 [2]: 122. 1868.

Known only from Baños, Hidalgo, the type locality.

Leaves 5 to 9 cm. long, obtuse, petiolate; spikes 2 cm. long.

15. **Phoradendron schumanni** Trel. Gen. Phorad. 62. *pl. 71, 72.* 1916.

Chihuahua, Durango, and Guanajuato; type from Jaral, Guanajuato; on *Quercus.*

Leaves oblong-elliptic or elliptic-lanceolate, obtuse, 6 to 8 cm. long, petiolate; spikes 2 to 7 cm. long.

16. **Phoradendron purpusi** Trel. Gen. Phorad. 62. *pl. 73.* 1916.

Veracruz; type from Zacuapan; on *Quercus.*

Leaves falcate-lanceolate, acute or obtuse, 8 to 15 cm. long, petiolate; spikes 5 cm. long or shorter.

17. **Phoradendron nervosum** Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 175. 1864.

Phoradendron conzattii Trel. Gen. Phorad. 63. *pl. 15.* 1916.

Veracruz to Oaxaca; type from Colipa, Veracruz; reported on *Annona, Liquidambar styraciflua, Pyrus,* and *Quercus.*

Leaves lanceolate, obtuse to attenuate, 9 to 30 cm. long, petiolate; spikes 2 to 6 cm. long; fruit reddish.

18. **Phoradendron reichenbachianum** (Seem.) Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 175. 1864.

Viscum reichenbachianum Seem. Bot. Voy. Herald 296. *pl. 62.* 1856.

Jalisco to Mexico; type from the Sierra Madre; on *Quercus.*

Leaves obtuse, 8 to 10 cm. long; spikes 3 to 5 cm. long.

19. **Phoradendron lanceolatum** Engelm. Mem. Amer. Acad. n. ser. 4: 59. 1849.

Nuevo León; type from Rinconada; on *Quercus.*

Leaves 6 to 8 cm. long, 1 to 1.5 cm. wide, obtuse, subpetiolate; spikes 3 to 4 cm. long.

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[1] "Ingerto" (often written "injerto") is the Spanish word for "graft," a term not inappropriate for mistletoe.

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20. Phoradendron falcatum (Schlecht. & Cham.) Trel. Gen. Phorad. 65. 1916.

Viscum falcatum Schlecht. & Cham. Linnaea 5: 172. 1830.

Viscum schiedeanum DC. Prodr. 4: 671. 1830.

San Luis Potosí and Veracruz; type from Jalapa; on *Quercus*.

Leaves 8 to 15 cm. long. 1.5 cm. wide, obtuse; spikes 1.5 to 2.5 cm. long.

21. Phoradendron forestierae Robins. & Greenm. Proc. Amer. Acad. 32: 36. 1896.

Phoradendron pringlei Trel. Gen. Phorad. 60. *pl. 70.* 1916.

Hidalgo and Puebla; type collected between Tehuacán and Esperanza Puebla; on *Forestiera* and *Fraxinus*.

Leaves linear-lanceolate, 5 to 16 cm. long, obtuse or acute; spikes 1 to 4 cm. long.

22. Phoradendron calyculatum Trel. Gen. Phorad. 54. *pl. 62, 63.* 1916.

Viscum falcatum Hook. Icon. Pl. 4: *pl. 368.* 1841. Not *V. falcatum* Schlecht. & Cham. 1830.

Veracruz and Oaxaca; type from Jalapa; on *Quercus*.

Leaves narrowly falcate-lanceolate, obtuse, 15 to 25 cm. long; spikes 3 to 4 cm. long.

23. Phoradendron californicum Nutt. Journ. Acad. Phila. II. 1: 185. 1848.

Baja California, Sonora, and Sinaloa. California (type locality) to Utah. Reported on *Acacia*, *Prosopis*, *Zizyphus*, *Parkinsonia*, *Olneya*, *Covillea*, and *Microrhamnus*.

Spikes 5 to 10 mm. long; fruit red, 3 mm. in diameter.

Russell[1] reports that this plant is eaten by the Pima Indians of Arizona. The stems bearing the fruit are boiled, and the fruit is then stripped off into the mouth and eaten.

24. Phoradendron ligatum Trel. Gen. Phorad. 24. *pl. 15.* 1916.

Chihuahua and Durango; probably in Baja California. California, Oregon (type locality), and Nevada. On *Juniperus* and *Cupressus*.

Spikes about 2 mm. long.

25. Phoradendron juniperinum Engelm. Mem. Amer. Acad. n. ser. 4: 58. 1849.

Chihuahua. Western Texas to Colorado, Utah, and Arizona; type from Santa Fe, New Mexico. On *Juniperus*.

Spikes 3 mm. long; fruit yellowish or wine-colored.

According to Hough, the Hopi Indians of Arizona use the plant as a substitute for coffee.

26. Phoradendron libocedri (Engelm.) Howell, Fl. Northw. Amer. 1: 608. 1902.

Phoradendron juniperinum libocedri Engelm.; S. Wats. Bot. Calif. 2: 105. 1880.

Baja California. California (type from Lassens Peak) and Oregon. On *Libocedrus decurrens*.

Spikes 3 mm. long; fruit straw-colored.

27. Phoradendron minutifolium Urban, Bot. Jahrb. Engler 23: Beibl. 5: 2. 1897.

Veracruz; type from Llanos de Perote; on *Juniperus*.

Leaves acute, 2 to 3 mm. long; spikes 3 mm. long.

28. Phoradendron capitellatum Torr.; Trel. Gen. Phorad. 25. *pl. 17.* 1916.

Sonora. Western Texas to Arizona; type from New Mexico. On *Juniperus*.

Leaves 1 to 1.5 cm. long, acute; spikes 5 mm. long; fruit straw-colored.

29. Phoradendron tequilense Trel. Gen. Phorad. 26. *pl. 18.* 1916.

Known only from the type locality, Sierra de Tequila, Jalisco. Reported on "*Thuya*" (*Cupressus* or *Juniperus*?).

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[1] Frank Russell, The Pima Indians, Ann. Rept. Bur. Amer. Ethnol. 26. 1908.

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Leaves 1 to 1.5 cm. long, acute, sessile; spikes 4 to 7 mm. long; fruit straw-colored.

30. **Phoradendron saltillense** Trel. Gen. Phorad. 27. *pl. 16.* 1916.

Known only from the type locality, San Antonio de las Alazanes, near Saltillo, Coahuila; on *Juniperus.*

Leaves 2 to 3 cm. long, acute, sessile; spikes 5 to 6 mm. long.

31. **Phoradendron bolleanum** (Seem.) Eichl. in Mart. Fl. Bras. 5 [2]: 134. 1868.

Viscum bolleanum Seem. Bot. Voy. Herald 295. *pl. 63.* 1856.

Chihuahua and Durango; type from the Sierra Madre; on *Juniperus;* one collection reported, perhaps erroneously, as on *Arbutus.*

Leaves 1 to 1.5 cm. long, acute, sessile; spikes 3 mm. long; fruit straw-colored. "Ingerto" (Durango).

32. **Phoradendron guadalupense** Trel. Gen. Phorad. 29. *pl. 22, 23.* 1916.

Known only from Guadalupe Island, Baja California.

Leaves 1.5 to 3 cm. long, very obtuse, sessile; spikes about 1 cm. long.

33. **Phoradendron densum** Torr.; Trel. Gen. Phorad. 27. *pl. 20.* 1916.

Sonora. California and Oregon; type from Mount Shasta. On *Juniperus.*

Leaves 1.2 to 2 cm. long very obtuse, sessile; spikes 3 mm. long; fruit straw-colored.

34. **Phoradendron pauciflorum** Torr. U. S. Rep. Expl. Miss. Pacif. 4[4]: 134. 1857.

Baja California. California (type locality) and Arizona. On *Abies* and perhaps on *Cupressus.*

Leaves 2 to 3 cm. long, obtuse, sessile; spikes 5 mm. long; fruit straw-colored.

35. **Phoradendron scaberrimum** Trel. Gen. Phorad. 52. *pl. 59.* 1916.

Sinaloa and Tepic; type from Santa Teresa, Tepic.

Leaves narrowly lanceolate, acutish to emarginate, 10 to 16 cm. long; spikes 2.5 cm. long.

36. **Phoradendron longifolium** Eichl. (in Mart. Fl. Bras. 5 [2]: 107. 1868, nomen nudum); Trel. Gen. Phorad. 53. *pl. 60.* 1916.

Known only from the type locality, San Pedro Nolasco, Oaxaca.

Leaves linear-oblong, acutish, 10 to 14 cm. long; spikes 2.5 cm. long.

37. **Phoradendron velutinum** (DC.) Nutt. Journ. Acad. Phila. II. 1: 185. 1847.

Viscum velutinum DC. Prodr. 4: 281. 1830.

Querétaro to Oaxaca; type from Toluca, Mexico. Guatemala. On *Cornus, Crataegus, Quercus,* etc.

Leaves falcate-lanceolate, acute or acuminate, 1 to 2.5 cm. wide; spikes 1.5 to 2 cm. long.

38. **Phoradendron lanatum** Trel. Gen. Phorad. 45. *pl. 46.* 1916.

Querétaro to Oaxaca; type from Hacienda Ciervo y Cadereyta, Querétaro.

Leaves narrowly elliptic or obovate, 2 to 3 cm. long, acute or obtuse; spikes 1 cm. long.

39. **Phoradendron eduardi** Trel. Gen. Phorad. 46. *pl. 47.* 1916.

Baja California; type from Carmen Island.

Leaves 1.5 to 2 cm. long, sessile, very obtuse; spikes 2.5 to 4 cm. long; fruit creamy white, 4 mm. in diameter.

40. **Phoradendron galeottii** Trel. Gen. Phorad. 46, *pl. 46.* 1916.

Veracruz; type from Mirador; on *Quercus.*

Leaves 2 to 5 cm. long, obtuse; spikes 1.5 cm. long or shorter.

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41. Phoradendron peninsulare Trel. Gen. Phorad. 50. *pl. 55.* 1916.
Baja California; type from Cape San Lucas.
Leaves 1.5 to 3 cm. long, very obtuse; spikes 1 to 2 cm. long.
According to Trelease, this may be the pistillate form of *P. diguetii.*

42. Phoradendron palmeri Greenm. Proc. Amer. Acad. **40:** 28. 1904.
Known only from the type locality, Alvárez, San Luis Potosí; on *Quercus.*
Leaves 2 to 3.5 cm. long, obtuse; spikes 0.5 to 2 cm. long. "Ingerto de encina."

43. Phoradendron mazatlanum Trel. Gen. Phorad. 47. *pl. 48.* 1916.
Known only from the type locality, Mazatlán, Sinaloa.
Leaves spatulate-oblong, 3.5 to 4.5 cm. long; spikes 2 cm. long.

44. Phoradendron globuliferum Trel. Gen. Phorad. 48. *pl. 51.* 1916.
Vicinity of Guaymas, Sonora.
Leaves elliptic-obovate, very obtuse, 2 cm. long; spikes 0.5 to 2 cm. long.
Perhaps not distinct from the next species.

45. Phoradendron brachystachyum (DC.) Nutt. Journ. Acad. Phila. II. **1:** 185. 1847.
Viscum brachystachyum DC. Prodr. **4:** 280. 1830.
Sonora to Tamaulipas, Veracruz, and Oaxaca; type collected between Tampico and Real del Monte; on *Arbutus, Quercus, Jacquinia, Guaiacum,* etc.
Leaves oblong-lanceolate to orbicular, very variable, 1.5 to 5 cm. long; spikes 1 to 1.5 cm. long.

46. Phoradendron tlacolulense Loes. Bull. Herb. Boiss. **2:** 536. *pl. 20.* 1894.
Oaxaca; type from Mitla.
Leaves orbicular or obovate, 1 to 2 cm. long; spikes 5 mm. long.

47. Phoradendron aureum Trel. Gen. Phorad. 49. *pl. 52.* 1916.
Known only from the type locality, Santa Cruz, Baja California.
Leaves 1 to 2 cm. long, short-petiolate; spikes 1 to 1.5 cm. long.

48. Phoradendron diguetii Van Tiegh. Bull. Mus. Hist. Nat. **1:** 31. 1895.
Phoradendron brachyphyllum Trel. Gen. Phorad. 49. *pl. 53.* 1916.
Phoradendron tumidum Trel. Gen. Phorad. 49. *pl. 53.* 1916.
Phoradendron saccatum Trel. Gen. Phorad. 50. *pl. 55.* 1916.
Baja California; on *Quercus, Veatchia, Jatropha,* etc.
Leaves 3 cm. long, short-petiolate; spikes 1.5 cm. long.

49. Phoradendron robinsoni Urban, Bot. Jahrb. Engler **23:** Beibl. 5: 4. 1897.
Puebla and Guerrero; type from Tehuacán, Puebla; on *Celtis.*
Leaves oblanceolate or obovate, very obtuse, petiolate; spikes 2 to 8.5 cm. long.

50. Phoradendron coryae Trel. Gen. Phorad. 43. *pl. 44.* 1916.
Phoradendron wilkinsoni Trel. Gen. Phorad. 44. *pl. 45.* 1916.
Chihuahua to Baja California. Western Texas to Arizona; type from Chiricahua Mountains, Arizona. On *Quercus.*
Leaves 1.5 to 3.5 cm. long, short-petiolate; spikes 1.5 to 2 cm. long; fruit white.

51. Phoradendron tomentosum (DC.) Oliver, Nat. For. Kjöbenhavn Vid. Medd. **1864:** 176. 1864.
Viscum tomentosum DC. Prodr. **4:** 670. 1830.
Viscum villosum Nutt.; Torr. & Gray, Fl. N. Amer. **1:** 654. 1840.
Phoradendron villosum Nutt. Journ. Acad. Phila. II. **1:** 185. 1848.
Phoradendron puberulum Trel. Gen. Phorad. 42. *pl. 43.* 1916.
Chihuahua to Baja California and Hidalgo; type from "Real de Catone." California and Oregon. On *Celtis, Prosopis, Quercus, Platanus, Acacia, Aesculus, Arctostaphylos. Populus, Rhus, Robinia, Salix,* etc.

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Leaves 2 to 3.5 cm. long, very obtuse, short-petiolate; spikes 1 to 3.5 cm. long; fruit white. The following names are reported, but they may apply to other species: "Visco cuercino," "liga" (Mexico); "ingerto" (Durango); "silmo" (Sinaloa).

52. **Phoradendron colipense** Trel. Gen. Phorad. 37. *pl. 33.* 1916.

Known only from the type locality, Colipa, Veracruz.

Leaves oblanceolate-elliptic, very obtuse, 5 to 8 cm. long; spikes 3.5 cm. long.

It is doubtful whether this and the following species are sufficiently distinct from each other or from *P. flavescens* (Pursh) Nutt., of the eastern United States.

53. **Phoradendron macrophyllum** (Engelm.) Cockerell, Amer. Nat. 34: 293. 1900.

Phoradendron flavescens macrophyllum Engelm.; Rothr. in Wheeler, Rep. U. S. Surv. 100th Merid. 6: 252. 1878.

Sonora. Arizona, the type from Camp Grant. On *Alnus, Celtis, Fraxinus, Juglans, Platanus, Populus, Salix*, etc.

Leaves 2.5 to 6 cm. long, short-petiolate; spikes 1.5 to 5 cm. long; fruit white, 4 to 5 mm. in diameter.

54. **Phoradendron cockerellii** Trel. Gen. Phorad. 38. *pl. 36.* 1916.

Chihuahua. New Mexico and western Texas; type from Silver City, New Mexico. On *Populus, Salix*, and *Fraxinus*.

Leaves 3.5 to 5.5 cm. long. petiolate; spikes 1.5 to 5 cm. long; fruit white.

55. **Phoradendron greggii** Trel. Gen. Phorad. 36. *pl. 22.* 1916.

Coahuila and Nuevo León; type from Rinconada, Nuevo León; on *Acacia* and *Prosopis*.

Leaves elliptic or broader, 2.5 to 4.5 cm. long, petiolate; fruit white.

56. **Phoradendron engelmanni** Trel. Gen. Phorad. 35 *pl. 29–31.* 1916.

Chihuahua. Western Texas; type from New Braunfels. On *Celtis, Quercus, Prosopis*, etc.

Leaves obovate, 3 to 5 cm. long, short-petiolate; fruit white.

57. **Phoradendron thyrsoideum** Trel. Gen. Phorad. 36. *pl. 33.* 1916.

Tamaulipas and San Luis Potosí; type from Victoria, Tamaulipas; on *Prosopis juliflora* and *Acacia farnesiana*.

Leaves obovate-spatulate, 3 to 5 cm. long, short-petiolate; fruit waxy white. "Ingerto blanco" (Tamaulipas).

4. ORYCTANTHUS Eichl. in Mart. Fl. Bras. 5 [2]: 87. 1868.

1. **Oryctanthus glaberrimus** (Oliver) Eichl. in Mart. Fl. Bras. 5 [2]: 89. 1868.

Loranthus glaberrimus Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 170. 1864.

Known only from Guatulco, the type locality.

Plants glabrous, the branches compressed; flowers very small, sunk in the axis of the spike.

5. STRUTHANTHUS Mart. Flora 13: 102. 1830.

Plants green, usually glabrous, parasitic upon dicotyledonous plants, the branches terete or compressed; leaves well developed, opposite; flowers small, spicate, racemose, or corymbose.

Leaves small, 16 mm. long or shorter.

Branches densely pubescent; flowers cymose-capitate----1. S. microphyllus.

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Branches glabrous; flowers mostly solitary.
Branchlets compressed; leaves very obtuse.....**2. S. inconspicuus.**
Branchlets terete; leaves acutish.....**3. S. inornus.**
Leaves large, 3 cm. long or often much longer.
Leaves abruptly acuminate at apex.
Flowers pedicellate; perianth 4.5 to 6 mm. long.....**4. S. deppeanus.**
Flowers sessile; perianth less than 4 mm. long.
Flower clusters sessile.....**5. S. densiflorus.**
Flower clusters pedunculate, the peduncles swollen and reflexed in fruit. **6. S. quercicola.**
Leaves rounded to acute at apex, never abruptly acuminate.
Leaf blades orbicular to elliptic, glaucescent; inflorescence loose, elongate, interrupted.
Style contorted; inflorescence usually shorter than the leaves. **7. S. venetus.**
Style straight; inflorescence longer than the leaves.....**8. S. hartwegi.**
Leaf blades oblong, lanceolate, linear, or oblong-obovate.
Inflorescence pedunculate, usually 3-flowered; leaves mostly obovate-oblong.....**9. S. diversifolius.**
Inflorescence sessile or nearly so; leaves mostly lanceolate to linear.
Leaves mostly 2.5 to 3.5 cm. wide.....**10. S. grahami.**
Leaves mostly 0.4 to 1.2 cm. wide.....**11. S. haenkeanus.**

1. **Struthanthus microphyllus** (H. B. K.) Don, Hist. Dichl. Pl. **3**: 413. 1834.
Loranthus microphyllus H. B. K. Nov. Gen. & Sp. **3**: 439. *pl. 300.* 1818.
Jalisco to Morelos; type from Cuernavaca; on *Quercus*, *Solanum*, etc.
Leaves lanceolate to ovate or almost linear, acute or acutish; flowers about 4 mm. long.

2. **Struthanthus inconspicuus** (Benth.) Standl. Contr. U. S. Nat. Herb. **20**: 212. 1919.
Loranthus inconspicuus Benth. Bot. Voy. Sulph. 102. 1844.
Sinaloa to Guerrero; type from San Blas, Tepic; on *Randia*, etc.
Leaves oblanceolate or obovate; branches greenish; flowers minute.

3. **Struthanthus inornus** (Robins. & Greenm.) Standl. Contr. U. S. Nat. Herb. **20**: 212. 1919.
Loranthus inornus Robins. & Greenm. Amer. Journ. Sci. **50**: 163. 1895.
Known only from the type locality, Cuicatlán, Oaxaca.
Leaves oblanceolate or subulate.

4. **Struthanthus deppeanus** (Cham. & Schlecht.) Blume; Schult. Syst. Veg. **7**: 1731. 1830.
Loranthus deppeanus Cham. & Schlecht. Linnaea **5**: 172. 1830.
Loranthus liebmanni Oliver, Nat. For. Kjöbenhavn Vid. Medd. **1864**: 172. 1864.
Veracruz; type from Jalapa.
Leaves ovate-lanceolate, about 7 cm. long, petiolate.
Loranthus liebmanni was described from Chinantla, Oaxaca, and may be different.

5. **Struthanthus densiflorus** (Benth.) Standl. Contr. U. S. Nat. Herb. **20**: 212. 1919.
Loranthus densiflorus Benth. Pl. Hartw. 62. 1840.
Veracruz to Oaxaca; type from Hacienda del Carmen. Central America. On *Citrus*, etc.
Leaves lanceolate or ovate, 6 to 10 cm. long; flowers verticillate along the axis of a short spike.

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6. **Struthanthus quercicola** (Cham. & Schlecht.) Blume; Schult. Syst. Veg. 7: 1731. 1830.

Loranthus quercicola Cham. & Schlecht. Linnaea 5: 173. 1830.

Loranthus crassipes Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 173. 1864.

San Luis Potosí and Veracruz; type from Jalapa; on *Quercus*, *Acacia farnesiana*, etc.

Leaves ovate or oval-ovate, 4 to 7.5 cm. long.

7. **Struthanthus venetus** (H. B. K.) Blume; Schult. Syst. Veg. 7: 1731. 1830.

Loranthus venetus H. B. K. Nov. Gen. & Sp. 3: 434. 1818.

Sinaloa to Guerrero and Tabasco; type from Cuernavaca, Morelos. Central America.

Stems elongate, trailing or scandent, brownish; leaves 3 to 11 cm. long, pale; flowers about 6 mm. long; fruit glaucous. "Cabellera" (Tabasco).

It is probable that this is the plant described by Sessé and Mociño[1] as *Loranthus volubilis*. This is based on plants from Cuernavaca, and the Nahuatl name is given as "teapizmictianiquauhitl."

8. **Struthanthus hartwegi** (Benth.) Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

Loranthus hartwegi Benth. Pl. Hartw. 62. 1840.

Described from Talea, Oaxaca; parastic on *Annona*. Reported from Costa Rica.

Leaves ovate-orbicular, 4 to 6.5 cm. long; flowers 6 mm. long.

9. **Struthanthus diversifolius** (Benth.) Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

Loranthus diversifolius Benth. Pl. Hartw. 63. 1840.

Described from Mexico, the locality not known; specimens from Jalisco and Colima seem to be closely related, and perhaps belong to this species.

Flowers about 1 cm. long.

10. **Struthanthus grahami** (Benth.) Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

Loranthus grahami Benth. Pl. Hartw. 62. 1840.

Morelos; perhaps also in Sonora and Sinaloa; reported from Veracruz and Oaxaca; on *Quercus*, etc.

Leaves 15 cm. long or smaller, short-petiolate, narrowed to an obtuse apex.

11. **Struthanthus haenkeanus**[2] (Presl) Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

Spirostylis haenkeana Presl; Schult. Syst. Veg. 7: 163. 1829.

Loranthus spirostylis DC. Prodr. 4: 315. 1830.

Sonora to Oaxaca; type from Acapulco. On *Celtis*, *Quercus*, *Nerium*, etc.

Branches long and slender, drooping or sometimes twining; leaves linear to lanecolate; fruit red or orange. "Toji" (Sonora).

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[1] Pl. Nov. Hisp. 51. 1887.

[2] Named in honor of Thaddeus Haenke (1761–1817), a Bohemian. He was to have accompanied the Malaspina expedition executed during the reign of Charles III, but he reached Cádiz the day after that organization had set sail. He took another ship and sailed for Buenos Aires, proceeding to Chile, where he joined Née, and with him journeyed to Mexico. Haenke's Mexican collections were made along the road from Acapulco to the City of Mexico. He died in Bolivia. His specimens are chiefly at Prague and Vienna. Presl published two volumes under the title "Reliquiae Haenkeanae," based upon his collections.

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DOUBTFUL SPECIES.

LORANTHUS INTERRUPTUS H. B. K. Nov. Gen. & Sp. 3: 440. 1817. Type from Ario, Michoacán.

LORANTHUS TEHUACANENSIS Oliver, Nat. For. Kjöbenhavn Vid. Medd. **1864**: 171. 1864. Described from Tehuacán, Puebla; reported from Oaxaca, Tabasco, and Guatemala. Perhaps of the genus *Oryctanthus*.

STRUTHANTHUS SELEROBUM Loes. Bull. Herb. Boiss. **2**: 536. 1894. Type from Matlatengo, Hidalgo.

6. PHRYGILANTHUS Eichl. in Mart. Fl. Bras. 5²: 45. 1868.

Plants glabrous, parasitic on dicotyledonous hosts, the branches terete; flowers large and showy, solitary or cymose.

Leaf blades linear or terete ..... 1. P. sonorae.
Leaf blades broadly spatulate-obovate ..... 2. P. palmeri.

1. **Phrygilanthus sonorae** (S. Wats.) Standl. Contr. U. S. Nat. Herb. **20**: 212. 1919.

Loranthus sonorae S. Wats. Proc. Amer. Acad. **24**: 73. 1889.

Baja California and Sonora; parasitic on *Elaphrium microphyllum;* type from Guaymas.

Plants glaucous, much branched; leaves slender, 4 to 6 mm. long; flowers bright red, 4 cm. long. "Ingerto" (Baja California).

2. **Phrygilanthus palmeri** (S. Wats.) Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. **1**: 134. 1897.

Loranthus palmeri S. Wats. Proc. Amer. Acad. **21**: 438. 1886.

Chihuahua to Jalisco and Puebla, on species of *Elaphrium;* type from Hacienda San Miguel, Chihuahua.

Plants green, with stout reddish brown branches; leaves 2 to 2.5 cm. long, petiolate, rounded at apex; flowers red, almost 4 cm. long.

7. PSITTACANTHUS Mart. Flora **13**: 106. 1830.

Parasites, usually upon dicotyledonous plants, with green leaves; flowers large, cymose or corymbose.

A plant of the family Loranthaceae and probably of this genus, growing on the Pico de Orizaba, is said to be known locally as "planta quebradora." The species of *Psittacanthus* (Greek for "parrot-flower") have more showy flowers than the Mexican representatives of other genera of the family.

Perianth velutinous ..... 1. P. mexicanus.
Perianth glabrous.
  Branches all terete, or nearly so.
    Anthers 5 to 6 mm. long; leaves cordate-clasping, glaucous. 2. P. auriculatus.
    Anthers about 18 mm. long; leaves obovate-elliptic ..... 3. P. macrantherus.
  Branches usually quadrangular, at least more or less angulate.
    Flowers 6.5 to 8 cm. long; leaves attenuate ..... 4. P. schiedeanus.
    Flowers 3 to 5 cm. long.
      Buds terete; perianth lobes dilated; leaves ovate or broadly cordate, obtuse ..... 5. P. karwinskyanus.
      Buds clavate; perianth lobes linear; leaves never cordate.
        Leaves usually falcate or very oblique, attenuate to the apex. 6. P. calyculatus.
        Leaves not falcate, rounded or very obtuse at the apex. 7. P. americanus.

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1. **Psittacanthus mexicanus** (Presl) Blume; Schult. Syst. Veg. 7: 1730. 1830.
Loranthus mexicanus Presl; Schult. Syst. Veg. 7: 129. 1829.
Described from Mexico, the locality not indicated.

2. **Psittacanthus auriculatus** (Oliver) Eichl. in Mart. Fl. Bras. 5²: 25. 1868.
Loranthus auriculatus Oliver, Nat. For. Kjöbenhavn Vid. Medd. 1864: 174. 1864.
Oaxaca; type from Pochutla.
Plants glaucous throughout, glabrous; leaves 3 to 4.5 cm. long, rounded at apex; flowers about 4 cm. long.

3. **Psittacanthus macrantherus** Eichl. in Mart. Fl. Bras. 5²: 26. 1868.
Sierra San Pedro Nolasco; said to be parasitic on pines.
Leaves 6 to 7.5 cm. long; flowers 5.5 to 6.5 cm. long.

4. **Psittacanthus schiedeanus** (Cham. & Schlecht.) Blume; Schult. Syst. Veg. 7: 1730. 1830.
Loranthus schiedeanus Cham. & Schlecht. Linnaea 5: 172. 1830.
Loranthus kerberi Fourn. Bull. Soc. Bot. France 30: 185. 1883.
Veracruz to Michoacán and Oaxaca; type from Jalapa; on *Salix*, etc. Central America.
Leaves lanceolate or ovate, 6 to 16 cm. long, asymmetric, short-petiolate, green; flowers numerous, corymbose. "Lirio," "muérdago," "sileno" (Oaxaca).

5. **Psittacanthus karwinskyanus** (Schult.) Eichl. in Mart. Fl. Bras. 5²: 26. 1868.
Loranthus karwinskyanus Schult. Syst. Veg. 7: 1641. 1830.
Described from Sultepec, Mexico; parasitic on *Annona reticulata*.
Leaves about 12.5 cm. long, 7.5 to 10 cm. wide; flowers almost 5 cm. long.

6. **Psittacanthus calyculatus** (DC.) Don, Hist. Dichl. Pl. 3: 415. 1834.
Loranthus calyculatus DC. Mém. Lorant. *pl. 10*. 1830.
Tamaulipas to Jalisco, Chiapas, and Yucatán; type from "Cuarcavara" (Cuernavaca ?). Central America. Parasitic on *Persea*, *Acacia*, *Prosopis*, *Quercus*, *Pithecollobium*, *Prunus persica*, *Citrus*, *Olea*, *Nerium*, *Salix*, etc.
Plants often a meter high; leaves mostly lanceolate, green; flowers red or yellow, showy. "Chac-xciu" (Yucatán, Maya); "ingerto" (Jalisco, Guanajuato); "batuu-chá" (Oaxaca, *Seler*); "visco," "visco cuercino," "quauhzitli," "mal de ojo," "muérdago" (Morelos, *Ramírez*); "malojo" (Jalisco); "ingerto de aguacate" (Tamaulipas); "liga" (Valley of Mexico, *Ramírez*); "quauhtzictli" (Mexico, Morelos, *Ramírez*); "yecapixtla" (*Cervantes*).
A decoction of the leaves and flowers is said to be used for treating wounds, and the distilled water as a cosmetic.

7. **Psittacanthus americanus** (Jacq.) Mart. Flora 13: 108. 1830.
Loranthus americanus Jacq. Stirp. Amer. 97. *pl. 67*. 1763.
Tepic to Chiapas and Veracruz; reported from Yucatán. Central America; West Indies.
Leaves 6 to 10 cm. long, green, short-petiolate; flowers corymbose, bright red. "Ingerto" (Guerrero, Michoacán); "xken" (Yucatán, Maya, *Dondé*).

28. OPILIACEAE. Opilia Family.

This family is omitted in the key to families. In that, pistillate specimens would run to the family Urticaceae (p. 22), with which the present group would scarcely be confused; and staminate specimens would run to the family Olacaceae (p. 26). The only Mexican genus of the latter family with distinct petals

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is *Ximenia*, in which they are densely hairy within, while in *Agonandra* the petals are glabrous within.

1. **AGONANDRA** Miers (Ann. Nat. Hist. II. 8: 172. 1851, nomen nudum); Benth. & Hook. Gen. Pl. 1: 349. 1862.

REFERENCE: Standley, The North American species of *Agonandra*, Journ. Washington Acad. Sci. 10: 505–508. 1920.

Shrubs or small trees, glabrous or nearly so, with slender, often pendulous branches; leaves alternate, entire, petiolate, stipulate; flowers small, in bracteate axillary racemes, usually dioecious; calyx minute, 4 or 5-lobate; staminate flowers with 4 or 5 narrow petals, the stamens 4 or 5, exserted, 4 small scales present below the stamens; pistillate flowers apetalous, the disk urceolate, surrounding the ovary; fruit fleshy, drupaceous.

Only one other species of the genus is known, a native of Brazil and Colombia.

Leaves acute or acuminate; young branches glabrous--------1. **A. racemosa.**
Leaves rounded or obtuse at apex; young branches puberulent.
Fruit 8 mm. long----------2. **A. obtusifolia.**
Fruit 15 mm. long----------3. **A. conzattii.**

1. **Agonandra racemosa** (DC.) Standl. Journ. Washington Acad. Sci. 10: 506. 1920.

Schaefferia racemosa DC. Prodr. 2: 41. 1825.

Sonora to Guerrero; originally described from one of Sessé and Mociño's plates.

Shrub or small tree, 4 to 5 meters high, glabrous throughout; leaves lanceolate to broadly ovate-elliptic, 3 to 7.5 cm. long, acute to broadly rounded at base, acute or acuminate at apex or sometimes obtuse and abruptly short-pointed; staminate flowers 2.5 mm. long, greenish; fruit subglobose, about 8 mm. long. "Palo del golpe" (Michoacán, Guerrero).

2. **Agonandra obtusifolia** Standl. Journ. Washington Acad. Sci. 10: 507. 1920.

Tamaulipas and Veracruz; type from Victoria, Tamaulipas.

Shrub, 1 to 3 meters high, with spreading branches; leaves short-petiolate, narrowly oblong to ovate, 2 to 5 cm. long, cuneate at base, somewhat succulent; staminate flowers 2.5 mm. long; fruit yellow, not edible. "Granadillo," "revienta cabra" (Tamaulipas).

3. **Agonandra conzattii** Standl. Journ. Washington Acad. Sci. 10: 508. 1920.

Oaxaca and Puebla; type from Portillo de Coyula, Distrito de Cuicatlán, Oaxaca.

Leaves short-petiolate, oblong, lanceolate, or oblong-ovate, 2 to 2.5 cm. long, cuneate at base, succulent, the petioles minutely puberulent. "Maromero" (Oaxaca).

29. OLACACEAE. Olax Family.

Shrubs or small trees; leaves alternate, estipulate, entire; flowers small, perfect, in cymes or racemes; calyx 4 or 5-dentate; corolla 4 to 6-lobed; stamens inserted with the perianth; fruit a drupe.

Stamens twice as many as the perianth lobes; perianth cleft nearly to the base, the lobes densely barbate within----------1. **XIMENIA.**
Stamens as many as the perianth lobes; perianth lobed to the middle or less deeply, the lobes sparsely or not at all barbate----------2. **SCHOEPFIA.**

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1. XIMENIA[1] L. Sp. Pl. 1193. 1793.

Shrubs or small trees, sometimes with spinose branchlets; leaves subcoriaceous; flowers whitish, solitary or in small axillary cymes; calyx 4 or 5-dentate; corolla 4 or 5-lobed.

Leaves and outer surface of the petals densely pubescent.....1. **X. pubescens.**
Leaves and outer surface of the petals glabrous.
Petioles 4 to 10 mm. long; leaves mostly 1.5 to 3.5 cm. wide; petals 7 to 10 mm. long, densely long-barbate within.....2. **X. americana.**
Petioles 3 mm. long or shorter; leaves 0.6 to 1.5 cm. wide; petals 5 to 6 mm. long, short barbate.....3. **X. parviflora.**

1. **Ximenia pubescens** Standl. Contr. U. S. Nat. Herb. **20:** 212. 1919.

Known only from the type locality, between Mixtepec and Colotepec, Oaxaca. Spiny shrub, the leaves small, mostly orbicular.

2. **Ximenia americana** L. Sp. Pl. 1193. 1753.

Veracruz to Colima, Chiapas, and Yucatán. Florida, West Indies, Central America, South America, and in the tropics of the Old World.

Spiny shrub or small tree, in some parts of its range 6 meters high; bark smooth, reddish, very astringent; leaves oblong or elliptic, 3 to 7 cm. long, pale beneath, rounded at apex; flowers yellowish white, fragrant; fruit yellow, subglobose, 1.5 to 2 cm. in diameter, with peculiar odor and acid flavor; wood hard, tough, close-grained, yellow, its specific gravity about 0.92. "Xkuk-ché" (Yucatán, Maya); "pepe nance" (El Salvador); "chocomico" (Nicaragua); "limoncillo" (Colombia); "yaná," "jía manzanilla," "ciruelo cimarrón," "ciruelillo" (Cuba); "manzanilla" (Guatemala, Honduras); "albarillo del campo" (Argentina).

The fruit, which resembles a plum in appearance, is edible, either raw or cooked. It is stated that oil has been extracted from the seeds in Brazil. The fruit is said to have purgative properties, and Grosourdy states that a sirup made from it is used in the West Indies for dropsy, rheumatism, etc. The plant is seldom large enough to furnish wood of importance, but the wood has sometimes been employed as a substitute for sandalwood (*Santalum*), which it somewhat resembles. In Florida and the British West Indies this species is known under various names, such as "hog plum," "tallow-wood," "mountain plum," "false sandalwood," and "wild olive."

3. **Ximenia parviflora** Benth. Pl. Hartw. 7. 1839.

San Luis Potosí to Sinaloa and Oaxaca; type from León, Guanajuato.

Spiny shrub, 1 to 2 meters high, with angled branches, the lower ones long and slender; leaves oblong or obovate; fruit globose, yellow. "Ciruelillo" (Guanajuato).

The fruit is edible.

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[1] The genus was named in honor of Francisco Ximénez, a native of Luna in the Kingdom of Aragón. In the early years of his life he was a soldier, and in 1605 he came to New Spain. He became a lay brother of the Convento de Santo Domingo de México February 25, 1612. The date of his death is not known. In 1615 there was published in the City of Mexico under his authorship a volume entitled "Quatro libros de la naturaleza y virtudes de las plantas, y animales que están receuidos en el uso de medicina en la Nueva España, y la méthodo, y corrección, y preparación, que para administrarlas se requiere con lo que el Doctos Francisco Hernández escriuió en lengua Latina." This was reprinted at Morelia in 1888. Ximénez's work is not a mere translation of Hernández, but contains much original information upon Mexican plants.

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2. SCHOEPFIA Schreb. Gen. Pl. 129. 1789.

Glabrous shrubs or small trees; leaves coriaceous; flowers in short axillary racemes, or solitary or fasciculate in the leaf axils; calyx small, cuplike, obscurely denticulate; corolla 4 to 6-lobed.

Leaf blades narrowly oblanceolate or rarely obovate--------1. S. californica.
Leaf blades lanceolate to broadly ovate.
Perianth about 3 mm. long, the lobes nearly as long as the tube. 2. S. angulata.
Perianth 4 to 6 mm. long, the lobes much shorter than the tube.
Perianth 5-parted----------3. S. mexicana.
Perianth 4-parted.
Perianth 4 to 5 mm. long, the lobes half as long as the tube or longer; leaves mostly 1.8 to 3.5 cm. wide----------4. S. schreberi.
Perianth 6 to 7 mm. long, the lobes one-third as long as the tube or shorter; leaves scarcely more than 1 cm. wide------5. S. parvifolia.

1. **Schoepfia californica** T. S. Brandeg. Proc. Calif. Acad. II. 2: 139. 1889.

Southern Baja California; type from San Gregorio.

Shrub or small tree, 2 to 6 meters high, with stiff divaricate branches, the older branches whitish; leaves glaucous, puberulent; flowers reddish yellow; fruit oval, 6 mm. long.

2. **Schoepfia angulata** Planch.; Hemsl. Diag. Pl. Mex. 5. 1878.

Veracruz; type from Zacuapan.

Shrub, nearly glabrous; leaves lanceolate or ovate, 2.5 to 5 cm. long, bright green; flowers small, yellow.

3. **Schoepfia mexicana** A. DC. in DC. Prodr. 14: 622. 1856.

Known only from the type locality, Tlacolula, Oaxaca.

Leaves ovate or ovate-elliptic, 2.5 to 3 cm. long, obtuse.

4. **Schoepfia schreberi** Gmel. Syst. Veg. 2: 376. 1791.

San Luis Potosí and Veracruz to Guatemala and Yucatán. Central America, West Indies, and northern South America.

Shrub or tree, 1.3 to 6.5 meters high; leaves broadly ovate, obtuse or acute, bright green; flowers yellow or greenish.

5. **Schoepfia parvifolia** Planch.; Hemsl. Diag. Pl. Mex. 5. 1878.

Sinaloa to Oaxaca.

Glabrous shrub or tree, sometimes 7 meters high, with a trunk 40 cm. in diameter, the branches stiff, gray; leaves ovate or oval, 2 to 3 cm. long, obtuse, bright green. "Palo fierro," "tecolotillo" (Sinaloa).

The wood is said to be heavy and blackish, and to be valued for carpenter work.

30. ARISTOLOCHIACEAE. Birthwort Family.

1. ARISTOLOCHIA L. Sp. Pl. 960. 1753.

REFERENCE: Duchartre in DC. Prodr. 15[1]: 432–498. 1864.

Erect or usually scandent plants; leaves alternate, entire or lobate; inflorescence axillary (sometimes borne at the base of the plant), the peduncles 1-flowered and solitary, fasciculate, or racemose, the perianth very variable in form; fruit a capsule.

It is difficult to determine from herbarium specimens or descriptions which species are fruticose and which herbaceous; perhaps other species should be included and some of those in the present list excluded. A number of herbaceous species occur in Mexico.

The species are highly valued in tropical America as a remedy for snake bites. Whether they have any real value for this purpose is uncertain. The Nahuatl

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name is "tlacopatl" (trumpet-medicine). In modern usage this has been modified to "tacopate," "tacopatle," "tacopaxtle," "tacopaste," etc.

Calyx limb with 3 long linear lobes.
  Leaves glabrous on the upper surface; calyx lip about 10 cm. long. **1. A. tricaudata.**
  Leaves pubescent on the upper surface; lip about 5 cm. long. **2. A. malacophylla.**
Calyx limb not 3-lobate.
  Leaf blades rounded at the base; plants erect ---- **3. A. arborea.**
  Leaf blades cordate at the base; plants scandent or trailing.
    Stems and margins of the leaves pilose with long brown hairs. **4. A. pilosa.**
    Stems and margins of the leaves without long brown hairs, often glabrous.
      Leaves sessile, densely soft-pilose beneath ---- **5. A. asclepiadifolia.**
      Leaves long-petiolate, puberulent or glabrous beneath.
        Calyx very large, the limb 18 to 35 cm. broad. Leaves deltoid-cordate, puberulent beneath ---- **6. A. grandiflora.**
        Calyx smaller, the limb less than 8 cm. broad, often much less.
          Leaves puberulent beneath.
            Leaf blades deltoid-cordate, deeply cordate at base. **7. A. pavoniana.**
            Leaf blades oval or oblong, shallowy cordate at base.
              Leaf blades ovate, glabrous on the upper surface, subcordate at base; flowers solitary ---- **8. A. ovalifolia.**
              Leaf blades oblong, puberulent on the upper surface, cordate at base; flowers racemose ---- **9. A. maxima.**
          Leaves glabrous beneath.
            Leaves acute or acutish, subcordate at base, green beneath; calyx limb 5 to 8 cm. wide ---- **10. A. odoratissima.**
            Leaves rounded or very obtuse at apex, deeply cordate at base, pale or glaucous beneath; calyx limb less than 2.5 cm. wide.
              Calyx limb somewhat bilobate, the large lobe acute or acuminate ---- **11. A. pardina.**
              Calyx limb not bilobate, obtuse ---- **12. A. taliscana.**

1. Aristolochia tricaudata Duchartre, Ill. Hort. Lem. 12: *pl. 523.* 1865.

Chiapas; the plant has been cultivated in European greenhouses.

Arborescent, with gray fissured bark; leaves oblong, 12.5 to 20 cm. long, acute or acuminate, pubescent beneath; flowers axillary, solitary, odorless, the calyx limb with 3 long narrow lobes, maroon outside, dark purple-brown within.

2. Aristolochia malacophylla Standl. Proc. Biol. Soc. Washington 33: 65. 1920.

Known only from the type locality, Salto de Zarâracua, Uruapam, Michoacán.

Leaves oval, 12.5 cm. long, cordate at the base.

3. Aristolochia arborea Linden; Hook. in Curtis's Bot. Mag. *pl. 5295.* 1862.

Chiapas, the type locality. Guatemala.

Erect shrub, 2 meters high, the trunk with corky bark; leaves narrowly oblong, about 30 cm. long; flowers clustered near the base of the stem.

4. Aristolochia pilosa H. B. K. Nov. Gen. & Sp. 2: 116. *pl. 113.* 1817.

Aristolochia ferruginea T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 51. 1914.

Oaxaca and Chiapas. Central America to Ecuador (the type locality).

Stems slender, scandent; leaves cordate, obtuse or acutish; calyx limb 4 to 5 cm. long. "Sombrerito," "hediondilla" (Guatemala).

5. Aristolochia asclepiadifolia T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 178. 1915.

Known only from the type locality, Consoquintla, Veracruz.

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Leaves oval, 8 to 18 cm. long, deeply cordate at base, rounded and short-pointed at apex.

6. **Aristolochia grandiflora** Swartz, Fl. Ind. Occ. 3: 1566. 1806.

Chiapas and Yucatán; reported from Veracruz. Central America and the West Indies; type from Jamaica.

High-climbing vine; leaves large, cordate, acute, nearly glabrous; calyx very large, the limb sometimes 45 cm. long, with a linear tip a meter long, yellowish and purple-spotted inside, the flowers with a disagreeable odor. "Guaco" (Veracruz, *Ramírez*); "flor de pato" (Yucatán); "güegüecho," "chompipe" (Nicaragua); "moco de güegüeche" (El Salvador).

The roots are reputed to be an antidote for the bites of snakes and other poisonous animals, and to have sudorific, abortive, and emmenagogue properties. Descourtilz states that the plant is poisonous to pigs, and that it was sometimes employed in the West Indies to poison human beings. The young shoots are reported to be eaten as a vegetable in some localities.

7. **Aristolochia pavoniana** Duchartre, Ann. Sci. Nat. IV. 2: 55. 1854.

Described from Mexico, the locality not known.

Leaves about 6 cm. long, acute; flowers axillary, solitary, the calyx limb 1.4 cm. long.

8. **Aristolochia ovalifolia** Duchartre, Ann. Sci. Nat. IV. 2: 50. 1854.

Known only from Oaxaca, the type locality, at an altitude of 660 meters.

Leaves 15 cm. long, subacuminate; calyx limb 2.3 cm. long. "Flor de guaco."

9. **Aristolochia maxima** L. Sp. Pl. ed. 2. 1361. 1763.

Reported from Yucatán. Central America, Colombia, and Venezuela.

Leaves 9 to 15 cm. long, rounded or obtuse at apex and often short-pointed; flowers large, racemose; capsule about 9 cm. long. "Guaco del sur" (Yucatán); "guaco" (Guatemala, Colombia, Venezuela); "contracapitano" (Venezuela); "cuajilote" (Costa Rica).

This, like many of the other species, is considered an antidote for snake bites. A closely related plant, possibly the same species, occurs in Tabasco, where it is known as "canastilla" and "farolito." It is reported that the young fruits are eaten in Costa Rica.

10. **Aristolochia odoratissima** L. Sp. Pl. ed. 2. 1362. 1763.

Tabasco and perhaps elsewhere. Central America and northern South America.

Leaves deltoid-cordate, acute or acutish, sometimes 3-lobate; calyx limb broad, about 10 cm. long. "Cocobá," "cococoba" (Tabasco).

11. **Aristolochia pardina** Duchartre, Ann. Sci. Nat. IV. 2: 47. 1854.

Colima and Guerrero; type from Colima.

Stems scandent, with corky bark; flowers greenish yellow, with black markings. "Guaco" or "huaco" (Colima); "bejuco amargo" (Guerrero).

The stems are used as a substitute for cordage, and an infusion of the leaves for fevers.

12. **Aristolochia taliscana**[1] Hook. & Arn. Bot. Beechey Voy. 309. 1839-40.

Aristolochia galeottii Duchartre, Ann. Sci. Nat. IV. 2: 44. 1854.

Sinaloa, Tepic, and Jalisco (type locality).

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[1] The specific name is more properly, perhaps, written as "*jaliscana*," but "*taliscana*" is the original spelling.

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Similar in general appearance to the last species; a slender vine with stems 2 to 3 meters long; capsules about 3 cm. long. "Huaco," "zapatito," "palito," "matanene del mar" (Sinaloa).

In Sinaloa the plant is highly esteemed as a remedy for the bites of snakes and other poisonous animals.

31. POLYGONACEAE. Buckwheat Family.

Shrubs or trees, sometimes scandent; leaves alternate or rarely opposite or verticillate, entire, stipulate, the stipules often united into a sheath; flowers mostly small, perfect or unisexual; corolla none; fruit a lenticular or 3-angled achene, usually surrounded by the persistent calyx.

Several other genera, all of whose species are herbaceous, occur in Mexico.

Plants with tendrils in the inflorescence, scandent ..... 7. **ANTIGONON.**
Plants without tendrils.
  Flowers one or more inside an involucre.
    Leaves alternate; involucre not accrescent in fruit, not colored; flowers perfect ..... 1. **ERIOGONUM.**
    Leaves opposite; involucre accrescent in fruit, red or purplish; flowers unisexual ..... 2. **HARFORDIA.**
  Flowers not involucrate.
    Flowers normally 5-parted.
      Perianth lobes not winged.
        Flowers unisexual ..... 3. **MUHLENBECKIA.**
        Flowers perfect ..... 4. **COCCOLOBA.**
      Perianth lobes winged.
        Leaves orbicular; pedicels not winged; filaments pubescent. 5. **NEOMILLSPAUGHIA.**
        Leaves not orbicular; pedicels winged; filaments glabrous. 6. **PODOPTERUS.**
    Flowers 6-parted or rarely 3-parted.
      Flowers perfect; perianth segments broadly ovate ..... 8. **GYMNOPODIUM.**
      Flowers dioecious; perianth segments of the fertile flowers long and narrow.
        Stamens numerous; fruit acutely trigonous ..... 9. **TRIPLARIS.**
        Stamens 9; fruit 3 to 6-sulcate, the angles obtuse. 10. **RUPRECHTIA.**

1. **ERIOGONUM** Michx. Fl. Bor. Amer. 1: 246. 1803.

Low shrubs, often tomentose; flowers surrounded by an involucre, the involucres spicate, umbellate, capitate, or cymose, the flowers small but often rather showy.

Numerous herbaceous species occur in northern Mexico. Most of the species of the genus grow in arid places.

Leaves not at all tomentose ..... 1. **E. orcuttianum.**
Leaves tomentose on one or both surfaces.
  Perianth densely pubescent.
    Perianth narrowed to a stipelike base; plants low, with depressed stems. 2. **E. undulatum.**
    Perianth without a stipelike base; plants tall, much branched ..... 3. **E. molle.**

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Perianth glabrous or nearly so.
  Involucres in heads or cymes.
    Leaf blades spatulate or rounded-rhombic, densely tomentose on both sides, the margins not revolute ..... 4. E. pondii.
    Leaf blades linear, oblong, or oblanceolate, glabrate on the upper surface, the margins strongly revolute ..... 5. E. fasciculatum.
  Involucres racemose or spicate.
    Involucres 1-flowered ..... 6. E. taxifolium.
    Involucres several-flowered.
      Branches erect, slender ..... 7. E. wrightii.
      Branches divaricate, very stout ..... 8. E. nodosum.

1. **Eriogonum orcuttianum** S. Wats. Proc. Amer. Acad. **20**: 371. 1885.

Baja California; type from Cantillas Mountains.

Shrub, about a meter high, with tortuous branches, the bark brownish and fissured; leaves rounded-obovate; branches of the inflorescence divaricate, the flowers whitish.

2. **Eriogonum undulatum** Benth. in DC. Prodr. **14**: 7. 1856.

Chihuahua to San Luis Potosí and Hidalgo.

Low depressed shrub; leaves oval to oblanceolate, white-tomentose beneath, long-petiolate; involucres umbellate or solitary; flowers white, showy.

This has been reported from Mexico as *E. jamesii* Benth., a name probably synonymous with *E. undulatum*.

3. **Eriogonum molle** Greene, Pittonia **1**: 207. 1888.

Known only from the type locality, Cedros Island, Baja California.

Erect shrub, 30 to 60 cm. high; leaves oval or ovate, thick, white beneath; involucres in a dense long-pedunculate cyme.

4. **Eriogonum pondii** Greene, Pittonia **1**: 267. 1889.

Baja California; type from Cedros Island.

Low depressed shrub; leaves about 1 cm. long; flowers white or pink.

5. **Eriogonum fasciculatum** Benth. Trans. Linn. Soc. Bot. **17**: 411. 1837.

Baja California. California (type locality), Nevada, and Arizona.

Shrub, 0.6 to 1 meter high; leaves short, often fascicled, white-tomentose or glabrate; flowers white.

The Coahuilla Indians of southern California use a decoction of the leaves for pains in the head or stomach, and a decoction of the flowers as an eye wash.

6. **Eriogonum taxifolium** Greene, Pittonia **1**: 267. 1889.

Known only from Cedros Island, Baja California.

Low, slender, much branched shrub; leaves linear; flowers white, the involucres in long interrupted spikes.

7. **Eriogonum wrightii** Torr.; Benth. in DC. Prodr. **14**: 15. 1856.

Chihuahua and Sonora to San Luis Potosí; Baja California (?). Western Texas (type locality) to southern California.

Cespitose shrub, 30 to 60 cm. high, white-tomentose throughout; leaves oval to oblong; flowers white.

8. **Eriogonum nodosum** Small, Bull. Torrey Club **25**: 49. 1898.

Northern Baja California. Southern California; type from Dos Cabezas.

Densely tomentose shrub, 0.3 to 1 meter high.

2. **HARFORDIA** Greene & Parry, Proc. Davenport Acad. **5**: 27. 1888.

Low, densely branched shrubs, with stiff gray branches; leaves very small, fleshy, spatulate; flowers axillary, the sepals in fruit large, reddish, conspicuously veined.

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Plants fruticose only at the base, the branches slender; leaves linear to spatulate ..... 1. H. macroptera.
Plants woody almost throughout, the branches very stout; leaves broadly spatulate ..... 2. H. fruticosa.

1. **Harfordia macroptera** (Benth.) Greene & Parry, Proc. Davenport Acad. 5: 28. 1888.
Pterostegia macroptera Benth. Bot. Voy. Sulph. 44. 1844.
Pterostegia galioides Greene, Bull. Calif. Acad. 4: 213. 1885.
Baja California.

2. **Harfordia fruticosa** Greene; Parry, Proc. Davenport Acad. 5: 28. 1888.
Pterostegia fruticosa Greene, Bull. Calif. Acad. Sci. 4: 212. 1885.
Known only from Cedros Island, Baja California.
Densely branched shrub, 0.6 to 1 meter high.
Perhaps not specifically different from the preceding.

3. MUHLENBECKIA Meisn. Gen. Pl. 1: 316. 1840.

Muhlenbeckia platyclada Meisn., a curious plant with long flat ribbon-like leafless stems, a native of the Solomon Islands, is sometimes cultivated. Seler reports that it grows upon trees in Veracruz, where it is perhaps naturalized.

1. **Muhlenbeckia tamnifolia** (H. B. K.) Meisn. Gen. Pl. 2: 227. 1840.
Polygonum tamnifolium H. B. K. Nov. Gen. & Sp. 2: 180. 1817.
Polygonum quadrangulatum Mart. & Gal. Bull. Acad. Brux. 10[2]: 353. 1843.
Veracruz to Morelos. Central America to Chile; type from Colombia.
Scandent or trailing shrub with brown stems; leaves oblong or ovate, cordate at base, acuminate; flowers very small, greenish, glomerate-spicate.

4. COCCOLOBA L. Syst. Nat. ed. 10. 1007. 1759.

REFERENCE: Lindau, Bot. Jahrb. Engler 13: 106-229. 1890.

Trees or shrubs; flowers small and inconspicuous, perfect, fascicled within small bracts, the fascicles spicate; perianth often very fleshy in fruit.

Ramírez reports the vernacular name "totó" for a Tabasco species of doubtful determination.

Perianth *lobes* accrescent and inclosing the fruit. Leaf blades obovate or oval, glabrous ..... 1. C. floribunda.
Perianth *tube* accrescent and inclosing the fruit.
Leaves more or less pubescent beneath, sometimes pubescent also on the upper surface.
Leaf blades mostly orbicular or nearly so, about as broad as long.
Leaves minutely puberulent beneath ..... 2. C. uvifera.
Leaves short-pilose beneath.
Leaf blades 12 to 50 cm. long, pilose on the upper surface. 3. C. grandifolia.
Leaf blades 5 to 8 cm. long, glabrous on the upper surface. 7. C. goldmanii.
Leaf blades about twice as long as broad or longer.
Rachis of the inflorescence glabrous or very minutely puberulent. 4. C. lapathifolia.
Rachis of the inflorescence densely short-pilose.
Leaf blades obtuse-acuminate, 12 to 18 cm. long, 5 to 7 cm. wide. 5. C. lindeniana.
Leaf blades rounded at the apex, 6 to 13 cm. long, 2.5 to 7 cm. wide. 6. C. liebmanni.

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Leaves glabrous, or sometimes sparsely pilose beneath along the costa.
Leaves peltate ..... **14. C. acapulcensis.**
Leaves not peltate.
Rachis of the inflorescence pubescent.
Pedicels as long as the ocreolae. Leaf blades 8 to 22 cm. long, 9 to 13 cm. wide ..... **8. C. schiedeana.**
Pedicels twice as long as the ocreolae or longer.
Leaf blades rounded or cordate at base ..... **9. C. cozumelensis.**
Leaf blades narrowed to the base ..... **10. C. chiapensis.**
Rachis of the inflorescence glabrous.
Leaf blades narrowed at base; nodes 1-flowered ..... **11. C. orizabae.**
Leaf blades rounded or cordate at base; nodes 1 to 3-flowered.
Pedicels 1 to 2 mm. long, much exceeding the ocreolae. **12. C. humboldti.**
Pedicels 1 mm. long or shorter, about equaling the ocreolae. **13. C. jurgenseni.**

1. **Coccoloba floribunda** (Benth.) Lindau, Bot. Jahrb. Engler 13: 217. 1890.
Campderia floribunda Benth. Bot. Voy. Sulph. 159. *pl. 52.* 1844.
Campderia mexicana Meisn. in DC. Prodr. 14: 171. 1856.
Oaxaca. Central America to Brazil; type from Honduras.
Tree; leaves 5 to 11 cm. long, 3 to 5 cm. wide, rounded or subcordate at base.

2. **Coccoloba uvifera** (L.) Jacq. Enum. Pl. Carib. 19. 1760.
Polygonum uvifera L. Sp. Pl. 365. 1753.
In coastal thickets, Tamaulipas to Yucatán and Sinaloa. Florida, West Indies, Central America, and northern South America.

Shrub or tree, sometimes as much as 15 meters high, with a trunk a meter in diameter, but usually much smaller, densely branched; bark thin, smooth, brown; leaves about 20 cm. wide, very thick, the veins often red; flowers white; fruit purple, 1 to 2 cm. in diameter, in long dense heavy racemes; wood hard, dark brown, taking a good polish, its specific gravity about 0.96. "Uva de la playa" (Tamaulipas, Veracruz, Venezuela); "uva de la mar" (Tamaulipas, Yucatán, Oaxaca, Porto Rico); "uvero" (Tamaulipas, Cuba); "uva" (Yucatán, Veracruz, Santo Domingo); "manzano" (Sinaloa); "uva caleta" (Cuba); "papaturro" (Costa Rica); "uvero de playa" (Panama, Costa Rica); "uvilla" (Santo Domingo).

Uvero? yes

In Florida and the British West Indies the plant is known as "sea-grape." "pigeon-wood," "horsewood," and "hopwood." The wood is highly esteemed in tropical America for cabinet work, and is used also for fuel. It is said to yield a red dye. The roots are astringent and have been employed as a remedy for dysentery. The fruit is edible, with an acidulous, somewhat astringent flavor, and in the West Indies it has been fermented, with sugar, to produce an alcoholic drink. Febrifuge properties are attributed to the bark. The shrub is often planted (as in Florida) for ornamental purposes, for the large thick leaves are of striking and handsome appearance. It grows readily from cuttings.

The first account of the plant, probably, is that given by Oviedo (Lib. VIII, Cap. XIII), who says: "The Christians give the name *uvero* to the tree the Indians call *quiabara*. This is a fine tree, with good wood, especially for making charcoal for blacksmiths and silversmiths; as they are trees with spreading tops, and not straight, although the branches are thick and the wood strong, they are useless for construction of houses, but may be employed for butchers' blocks and shoe lasts. The wood resembles that of *madroño*, for it is red, but it is stronger. The fruit consists of thin racemes of grapes, sepa-

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rated from each other, rose or purple in color, and good to eat, although the stone is very large in proportion to the size of the fruit and the amount of flesh; the largest are the size of a filbert. The leaves are like those illustrated; they are so different from other leaves that I have shown them here. The largest of these leaves are a palm broad or larger, and some are smaller At the time that wars were going on in Hispaniola and the other islands and on Tierra-Firma, as the Christians did not carry with them paper and ink, they used these leaves like paper. The leaves are green and thick as those of ivy; the veins are red or purple and fine. and with a pin or sharp point one can write anything on them, from one end to the other, while they are green and freshly cut; the letters resemble white scratches and stand out so well from the face of the leaf that they are easily legible. Thus written upon, the leaves were sent by an Indian wherever the Spaniards wished them to go. Although the midvein of the leaf is rather large, the other veins are so small that they do not interfere with the writing."

3. **Coccoloba grandifolia** Jacq. Enum. Pl. Carib. 19. 1760.
Coccoloba pubescens L. Sp. Pl. ed. 2. 523. 1762.
Reported from Mexico, the locality not stated. West Indies and the Guianas.
Tree, 12 to 25 meters high, with erect trunk; leaves orbicular or broadly cordate, 8 to 60 cm. wide, coriaceous. "Moralón" (Porto Rico).

4. **Coccoloba lapathifolia** Standl., sp. nov.
Type from Acapulco, Guerrero (*Palmer* 206; U. S. Nat. Herb. no. 1,016,048).
Petioles 5 mm. long, finely puberulent; leaf blades narrowly oblong or lance-oblong, 14.5 to 18.5 cm. long, 5 to 5.5 cm. wide, deeply cordate at base, rounded or very obtuse at apex, coriaceous, finely puberulent or glabrate on the upper surface, the venation inconspicuous, pilose or short-villous beneath along the costa and lateral veins or finally glabrate, the venation prominent, the lateral veins about 15 on each side; racemes terminal, 9 to 18 cm. long, slender, glabrous or nearly so, rather densely flowered, the pedicels 3 times as long as the ocreolae, glabrous; perianth glabrous; filaments exserted.

5. **Coccoloba lindeniana**[1] (Benth.) Lindau, Bot. Jahrb. Engler 13: 182. 1890.
Campderia lindeniana Benth.; Benth. & Hook. Gen. Pl. 3: 103. 1880.
Known only from the type locality, Teapa, Tabasco.
Shrub; leaves oblong or lance-oblong, cordate at base.

6. **Coccoloba liebmanni** Lindau, Bot. Jahrb. Engler 13: 189. 1890.
Colima to Oaxaca; type from Pochutla, Oaxaca.
Leaves oblong-obovate or oblong, coriaceous, cordate at base.

7. **Coccoloba goldmanii** Standl., sp. nov.
Type from the valley of the Río Fuerte, Sinaloa (*Goldman* 245; U. S. Nat. Herb. no. 335744).
Branches puberulent at first; ocreae 4 to 5 mm. long; petioles 12 to 15 mm. long, densely puberulent; leaf blades orbicular or nearly so, 5 to 8 cm. long, rounded at apex, rounded or emarginate at base, thick-coriaceous, green on the upper surface, puberulent on the veins, the costa and lateral veins slender, prominent, the other venation inconspicuous, slightly paler beneath, short-pilose, especially on the veins, the venation very prominent, reticulate; racemes

[1] Named in honor of Jean Jules Linden, who was associated with Ghiesbreght in botanical exploration of Mexico. He collected (about 1837–1839) in Yucatán, Chiapas, and Tabasco, and perhaps elsewhere. He afterwards became the proprietor of the famous nurseries at Ghent, once the property of Verschaffelt.

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12 to 25 cm. long, slender, the rachis short-pilose, the pedicels mostly solitary, puberulent, stout, twice as long as the ocreolae; fruiting calyx glabrous, 8 mm. long; achene ellipsoid, brown, lustrous.

8. **Coccoloba schiedeana** Lindau, Bot. Jahrb. Engler **13**: 187. 1890.
Coccoloba barbadensis mexicana Meisn. in DC. Prodr. **14**: 153. 1856.
?*Coccoloba oaxacensis* Gross, Repert. Nov. Sp. Fedde **12**: 219. 1913.
Veracruz to Guerrero, Chiapas, and Yucatán; type from Papantla, Veracruz. Guatemala.

Small or large tree; leaves mostly oval, obtuse to cordate at base; flowers white. "Carnero de la costa" (Oaxaca); "tepalcahuite" (Veracruz); "tamulero" (Michoacán, Guerrero); "carnero" (Chiapas, Oaxaca); "uvero" (Veracruz); "palo de carnero" (Oaxaca).

The wood is used for cart wheels and other purposes. The fruit is edible.

The writer has seen no material of *C. oaxacensis*, and it may be a distinct species.

9. **Coccoloba cozumelensis** Hemsl. Biol. Centr. Amer. Bot. **4**: 108. 1887.
Coccoloba yucatana Lindau, Bot. Jahrb. Engler **13**: 190. 1890.
Yucatán; type from Cozumel Island.
Leaves ovate or oblong-ovate, obtuse or acute, 3 to 10 cm. long.

10. **Coccoloba chiapensis** Standl. Proc. Biol. Soc. Washington **33**: 67. 1920.
Known only from the type locality, Finca Irlanda, Chiapas.
Large tree; leaves elliptic, 15 to 20 cm. long, acuminate.

11. **Coccoloba orizabae** Lindau, Bot. Jahrb. Engler **13**: 189. 1890.
Known only from Orizaba, the type locality.
Leaves lance-ovate, obtuse-acuminate, 4.5 to 10 cm. long; fruit 1 cm. long.

12. **Coccoloba humboldti** Meisn. in DC. Prodr. **14**: 163. 1856.
Tamaulipas to Oaxaca and Tabasco.
Shrub or small tree; leaves oval or ovate, about 8 cm. long; flowers white. "Tocó prieto" (Tabasco).

13. **Coccoloba jurgenseni** Lindau, Bot. Jahrb. Engler **13**: 188. 1890.
Colima to Oaxaca (type locality).
Leaves oblong or oval, 8 to 20 cm. long.

14. **Coccoloba acapulcensis** Standl. Proc. Soc. Washington **33**: 66. 1920.
Known only from the type locality, Acapulco, Guerrero.
Easily distinguished from the other Mexican species by its peltate suborbicular leaves, these 5.5 to 8 cm. wide.

5. NEOMILLSPAUGHIA Blake, Bull. Torrey Club **48**: 84. 1921.

1. **Neomillspaughia emarginata** (Gross) Blake, Bull. Torrey Club **48**: 85. 1921.
Podopterus emarginatus Gross, Repert. Sp. Nov. Fedde **12**: 218. 1913.
Yucatán; type from Kabah.
Glabrous shrub or tree; leaves orbicular, 7 to 10 cm. wide, coriaceous, emarginate at base and apex; flowers in long racemes; perianth segments 5, the outer ones winged, the inner ones small.
In general appearance the plant resembles some species of *Coccoloba*.

6. PODOPTERUS Humb. & Bonpl. Pl. Aequin. **2**: 89. 1809.

Shrubs or small trees; leaves thin, early deciduous; flowers fasciculate or racemose, perfect; outer perianth segments with broad scarious wings; stamens 5.

One other species is known, a native of Guatemala.

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Leaf blades broadly obovate or rhombic-obovate, acute to acuminate at base. 1. P. mexicanus.
Leaf blades oval-ovate, cordate at base 2. P. cordifolius.

1. **Podopterus mexicanus** Humb. & Bonpl. Pl. Aequin. 2: *pl. 107.* 1809.

Tamaulipas to Colima, Oaxaca, and Yucatán; type from Veracruz. Guatemala.

Shrub or small tree, sometimes 6 meters high, with stout spinose branchlets; leaves deciduous, glabrous; flowers in dense fascicles, appearing when the plant is leafless, greenish tinged with brown.

2. **Podopterus cordifolius** Rose & Standl. Proc. Biol. Soc. Washington 33: 66. 1920.

Colima to Oaxaca; type locality, on the seashore at Manzanillo, Colima.

Small tree with very straggling, pendent branches.

7. ANTIGONON Endl. Gen. Pl. 310. 1837.

Plants fruticose or chiefly herbaceous, scandent; leaves cordate or deltoid; flowers fasciculate, the fascicles racemose.

Exterior sepals ovate in anthesis 1. A. guatimalense.
Exterior sepals cordate in anthesis.
Leaf blades decurrent on the petiole.
Sepals reddish, in fruit nearly as broad as long, obtuse or rounded at apex, usually apiculate; plants usually copiously pubescent. 2. A. cinerascens.
Sepals yellowish, longer than broad in fruit, acute or acutish; plants nearly glabrous 3. A. flavescens.
Leaf blades not decurrent 4. A. leptopus.

1. **Antigonon guatimalense** Meisn. in DC. Prodr. 14: 184. 1856.

Polygonum grandiflorum Bertol. Nov. Comm. Acad. Bonon. 4: 412. 1840. Not *P. grandiflorum* Willd. 1799.

Antigonon grandiflorum Robinson, Proc. Amer. Acad. 44: 613. 1909.

Guerrero and Oaxaca. Central America and Colombia; type from Guatemala.

Leaves broadly cordate; inflorescence copiously pubescent, the flowers rose-colored; sepals in fruit about 3 cm. long.

2. **Antigonon cinerascens** Mart. & Gal. Bull. Acad. Brux. 10[1]: 14. 1843.

Veracruz, Oaxaca, and Chiapas; type from Jalapa. Central America.

Leaves broadly ovate-cordate, abruptly short-acuminate; flowers purplish red. "Bejuco de colación" (El Salvador); "bellísima" (Nicaragua).

3. **Antigonon flavescens** S. Wats. Proc. Amer. Acad. 22: 446. 1887.

Jalisco to Oaxaca; type from Chapala, Jalisco.

Leaves deltoid, often very large, glabrous, acute or acuminate; flowers greenish white or yellowish. "Coamecate," "coamecatl" (Jalisco, *Urbina*).

4. **Antigonon leptopus** Hook. & Arn. Bot. Beechey Voy. 308. *pl. 69.* 1839–40.

Antigonon cordatum Mart. & Gal. Bull. Acad. Brux. 10[1]: 14. 1843.

Chihuahua to Baja California, southward to Oaxaca; often cultivated elsewhere; type from the west coast.

Large vine, often climbing to the tops of the highest trees, sometimes running over low shrubs; leaves deltoid or cordate, acuminate; sepals at first small and inconspicuous but becoming large, purplish red, and very showy, the racemes (as in the other species) furnished with tendrils. "Flor de San Diego" (Veracruz, Oaxaca, Yucatán); "enredadera de San Diego" (Nuevo León, Oaxaca); "rosa de mayo" (Sinaloa); "corona de la reina" (Tamaulipas); "hierba de

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Santa Rosa" (Morelos); "San Miguelito" (Sonora, Sinaloa); "fulmina" (Guerrero, Morelos); "bellísima" (Oaxaca, Colombia); "corona" (Sinaloa, Tamaulipas); "flor de San Miguel" (Sonora, Guatemala); "coronilla" (Sinaloa); "coamecate" (Morelos, Sinaloa); "coamecatl" (Guanajuato, Texas); "cuamecate" (Durango, Jalisco; from the Nahuatl, *cuau-mecatl*=tree+cord); "bejuco de colación" (El Salvador); "coralillo," "coralillo rosado" (Cuba); "cadena de amor" (Philippine Islands).

A very showy and handsome plant, and cultivated for this reason not only in Mexico but in many other regions. In general appearance it suggests *Bougainvillea*, and is equally handsome. It is a rapid grower and remains in bloom a long time. In Florida it is known as "Confederate vine." The flower clusters serve as tendrils for the support of the plant, and shorten themselves by bending at the joints in a zigzag form. The roots bear tubers which are usually small, although they are said sometimes to weigh as much as 15 pounds. They are edible and have a nutlike flavor. For an illustration of this species see Contr. U. S. Nat. Herb. 8: *pl. 18*.

8. GYMNOPODIUM Rolfe in Hook. Icon. Pl. IV. 7: *pl. 2699*. 1901.

Shrubs or trees; leaves alternate, subsessile; flowers fascicled in racemes, slender-pediceled; inner perianth segments small and inconspicious; stamens 9; fruit a small 3-angled achene.

One other species is known, a native of British Honduras.

Sepals cordate at base ..... 1. G. antigonoides.
Sepals cuneate or decurrent at base ..... 2. G. ovatifolium.

1. **Gymnopodium antigonoides** (Robinson) Blake, Bull. Torrey Club 48: 84. 1921.

Millspaughia antigonoides Robinson; Millsp. & Loes. Bot. Jahrb. Engler 36: Beibl. 80: 14. 1905.

Yucatán and Chiapas; type from Progreso, Yucatán.

Shrub or tree, sometimes 12 meters high; leaves obovate to oval, 2 to 5.5 cm. long, rounded at apex, puberulent when young; flowers fasciculate, racemose, greenish, the sepals in age 7 mm. long.

The Chiapas specimens have slightly broader and larger leaves than those from Yucatán.

2. **Gymnopodium ovatifolium** (Robinson) Blake, Bull. Torrey Club 48: 84. 1921.

Millspaughia ovatifolia Robinson; Millsp. & Loes. Bot. Jahrb. Engler 36: Beibl. 80: 14. 1905.

Known only from the type locality, Progreso, Yucatán.

Leaves broadly ovate, 5 cm. long, acutish.

9. TRIPLARIS L. Syst. Nat. ed. 10. 881. 1759.

1. **Triplaris auriculata** Meisn. in DC. Prodr. 14: 174. 1856.

Chiapas and perhaps elsewhere in Mexico, the type from some unknown locality.

Shrub or tree, more or less pubescent; leaves large, oval, short-petiolate; flowers dioecious, racemose, the pistillate calyx accrescent and in fruit about 5 cm. long.

The Mexican material seen appears to be the same as *T. macombii* Donn. Smith, and is perhaps not different from *T. surinamensis* Cham. *T. auriculata* is probably the plant reported from Chiapas as *Triplaris* sp. with the vernacular

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name "palo mulato." A related species, *T. tomentosa* Wedd., is a small tree with hollow stems infested by ants, known in Costa Rica as "hormigo" and "tabaco."

10. **RUPRECHTIA** C. A. Meyer, Mém. Acad. St. Pétersb. VI. 6: 148. 1840.

Trees or shrubs with rather small leaves; flowers dioecious, fasciculate in short spikes; pistillate calyx accrescent in fruit.

Venation of the lower surface of the leaves very prominent and finely reticulate.
- Fruiting sepals 3.5 to 4 cm. long ..... 1. **R. macrosepala.**
- Fruiting sepals 1.3 to 2.7 cm. long.
  - Leaf blades narrowly elliptic-oblong or lanceolate, 0.8 to 2.5 cm. wide, nearly glabrous beneath; fruiting sepals 1.3 to 1.8 cm. long. ..... 2. **R. occidentalis.**
  - Leaf blades elliptic, 1.8 to 3.5 cm. wide, densely short-pilose beneath; fruiting sepals about 2.5 cm. long ..... 3. **R. fusca.**

Venation of the lower surface of the leaves neither prominent nor reticulate.
- Leaves densely short-pilose beneath ..... 4. **R. pringlei.**
- Leaves glabrous beneath or nearly so.
  - Leaves ovate or broadly ovate, widest at or below the middle, acute or acuminate ..... 5. **R. cumingii.**
  - Leaves mostly oblanceolate-oblong, widest above the middle, obtuse or acutish ..... 6. **R. pallida.**

1. **Ruprechtia macrosepala** Standl., sp. nov.

Sinaloa; type from Varal, Municipalidad de Mazatlán (*Dehesa* 1508; U. S. Nat. Herb. no. 1,012,464).

Branchlets slender, brownish; ocreae 2.5 to 3 mm. long; petioles stout, 3 to 5 mm. long; leaf blades elliptic-ovate, 6.5 to 11.5 cm. long, 3 to 4.5 cm. wide, obtuse or rounded at base, acute or acuminate at apex, green and glabrous on the upper surface, slightly paler beneath, sparsely strigose along the veins, the venation very prominent and finely reticulate; pistillate racemes numerous, laxly flowered, the flowers slender-pedicellate; calyx 3.5 to 4 cm. long, densely appressed-pilose below, glabrate above; inner calyx lobes linear-attenuate, 4 to 5 mm. long, the outer lobes ligulate-spatulate, reticulate-veined, rounded at apex, tinged with red at first; achene 8 to 9 mm. long, glabrous.

2. **Ruprechtia occidentalis** Standl. Proc. Biol. Soc. Washington 33: 66. 1920.

Sinaloa; type from San Blas.

Shrub, about 3 meters high; leaves 3 to 8 cm. long, 1 to 2.5 cm. wide, acuminate to acutish.

3. **Ruprechtia fusca** Fernald, Proc. Amer. Acad. 33: 86. 1897.

Puebla and Guerrero; type from Acapulco.

Shrub or small tree, 4.5 meters high, the trunk 20 cm. in diameter; leaves very thick, acute, with fulvous pubescence.

4. **Ruprechtia pringlei** Greenm. Proc. Amer. Acad. 33: 476. 1898.

Oaxaca; type from Tomellín Canyon.

Shrub or small tree, 4 to 6 meters high, with gray bark; leaves oblong-ovate, 4 to 7 cm. long; fruiting calyx 2 to 2.5 cm. long.

5. **Ruprechtia cumingii** Meisn. in DC. Prodr. 14: 179. 1856.

Veracruz. Central America and Colombia (type locality).

Large or small tree with rounded crown; leaves ovate, acuminate, comparatively thin, 4 to 7.5 cm. long, 1.8 to 3.5 cm. wide; fruiting calyx about 2 cm. long.

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6. **Ruprechtia pallida** Standl., sp. nov.

Michoacán and Guerrero; type from Cayaco, Michoacán (*Nelson* 6964; U. S. Nat. Herb. no. 399283).

Branches blackish brown, rugose; ocreae 1.5 mm. long; petioles 3 to 5 mm. long; leaf blades oblanceolate-oblong or elliptic-oblong, 4.5 to 7 cm. long, 1.5 to 2 cm. wide, usually cuneate at base, obtuse to subacute at apex, subcoriaceous, pale on both surfaces, glabrous above, the venation inconspicuous, glabrous beneath except for a few scattered hairs along the costa, the lateral veins about 9 on each side, prominent, the other venation inconspicuous; pistillate racemes (very immature) about 2 cm. long, densely flowered; calyx densely pilose with short subappressed hairs.

32. CHENOPODIACEAE. Goosefoot Family.

REFERENCE: Standley, Chenopodiaceae, N. Amer. Fl. 21: 3–93. 1916.

Shrubs, usually low, often succulent; leaves opposite or alternate, estipulate, sometimes reduced to scales; flowers small, perfect or unisexual; fruit a utricle, 1-seeded.

A large number of herbaceous species of various genera are found in Mexico.

Leaves reduced to scales; stems jointed; flowers in fleshy spikes or sunk in the joints of the stems.
- Branches alternate ..... 3. **ALLENROLFEA.**
- Branches opposite ..... 4. **ARTHROCNEMUM.**

Leaves well developed; stems not jointed; flowers solitary or clustered in the axils of the leaves.
- Embryo spirally coiled; leaves very fleshy, terete or semiterete ..... 5. **DONDIA.**
- Embryo not coiled; leaves usually flat.
  - Pubescence of inflated hairs or wanting, never of slender hairs. ..... 1. **ATRIPLEX.**
  - Pubescence of silky hairs ..... 2. **EUROTIA.**

1. ATRIPLEX L. Sp. Pl. 1052. 1753.

Shrubs with scurfy whitish pubescence; leaves alternate or opposite, entire or dentate; flowers unisexual; fruit inclosed by bracts.

Several herbaceous representatives of the genus are found in Mexico. The plants are of considerable value as forage for stock.

Fruiting bracts with 4 longitudinal wings.
- Bracts 7 to 25 mm. long, the free portion equaling or usually shorter than the wings ..... 1. **A. canescens.**
- Bracts 4 to 10 mm. long, the free portion much longer than the wings.
  - Pedicels of the fertile flowers 2 mm. long or less; bracts 4 to 6 mm. long. ..... 2. **A. linearis.**
  - Pedicels 4 to 7 mm. long; bracts 6 to 10 mm. long ..... 3. **A. macropoda.**

Fruiting bracts not winged.
- Leaves all or nearly all opposite. Leaves sessile, 2 to 5 mm. long. ..... 4. **A. matamorensis.**
- Leaves alternate, or the lowest opposite.
  - Leaves dentate ..... 5. **A. acanthocarpa.**
  - Leaves entire.
    - Leaves sagittate, clasping, 2 to 4 mm. long ..... 6. **A. julacea.**
    - Leaves never sagittate, usually much larger.
      - Bracts entire, 5 to 12 mm. long ..... 7. **A. confertifolia.**
      - Bracts dentate or crenulate, usually smaller.

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Plants tall shrubs, usually a meter high or more; leaves neither obovate nor orbicular.

Bracts crenulate; leaves petiolate, the blades 1.5 to 5 cm. long. 8. A. lentiformis.

Bracts laciniate-dentate; leaves sessile, usually less than 1 cm. long. 9. A. polycarpa.

Plants low shrubs, rarely 60 cm. high or, if larger, the leaves obovate or orbicular.

Bracts 2 to 3 mm. long 10. A. insularis.

Bracts 4 to 10 mm. long.

Bracts 4 to 8 mm. long, broader than long 11. A. obovata.

Bracts 8 to 10 mm. long, longer than broad 12. A. pringlei.

1. **Atriplex canescens** (Pursh) Nutt. Gen. Pl. 1: 197. 1818.

Calligonum canescens Pursh, Fl. Amer. Sept. 370. 1814.

Obione tetraptera Benth. Bot. Voy. Sulph. 48. 1844.

Obione berlandieri Moq. in DC. Prodr. 13 [2]: 114. 1849.

Baja California to Coahuila, San Luis Potosí, and Zacatecas. Northward in the United States to Oregon and South Dakota; type from South Dakota.

Densely branched, grayish shrub, usually 1 to 1.5 meters high, often forming broad clumps; leaves mostly linear, obtuse; flowers dioecious. "Costillas de vaca" (Zacatecas); "chamiso" (Baja California, Chihuahua, New Mexico); "cenizo" (Chihuahua, Sonora).

In some parts of its range this plant, like others of the genus, is of some importance as a forage plant. The leaves have a salty flavor. The seeds of this and other species have been used as food by the Gosiute Indians of Utah.

2. **Atriplex linearis** S. Wats. Proc. Amer. Acad. 24: 72. 1889.

Dry plains and hillsides, Sonora and Baja California; type from Guaymas. Southern Arizona and California.

Dense shrub, 1 to 2.5 meters high; leaves linear, 1 to 5 cm. long, whitish. "Chamiso" (Baja California).

3. **Atriplex macropoda** Rose & Standl. N. Amer. Fl. 21: 72. 1916.

Known only from the type locality, Pichilinque Island, Baja California.

Shrub with slender branches; leaves linear, 1 to 1.8 cm. long.

4. **Atriplex matamorensis** A. Nels. Proc. Biol. Soc. Washington 17: 99. 1904.

Atriplex oppositifolia S. Wats. Proc. Amer. Acad. 9: 118. 1874. Not *A. oppositifolia* Vill. 1779.

Tamaulipas; type from the Rio Grande Valley, near Matamoros, Southwestern Texas.

Small shrub, 20 to 40 cm. high, with slender, very leafy branches; leaves sessile, lance-oblong, 2 to 5 mm. long, entire, obtuse or acutish; bracts suborbicular, 3 mm. long, dentate.

5. **Atriplex acanthocarpa** (Torr.) S. Wats. Proc. Amer. Acad. 9: 117. 1874.

Obione acanthocarpa Torr. U. S. & Mex. Bound. Bot. 183. 1859.

Chihuahua to Nuevo León. Western Texas and southern New Mexico; type from plains near the Burro Mountains, New Mexico.

Shrub, 1 meter high or less; leaves oblong to broadly obovate, 1.5 to 5 cm. long, coarsely dentate; flowers monoecious; bracts 7 to 15 mm. long, the margins laciniate, the sides with numerous long flattened appendages.

6. **Atriplex julacea** S. Wats. Proc. Amer. Acad. 20: 370. 1885.

Baja California; type from Bahía de Todos Santos.

Procumbent or erect shrub, the slender branches densely leafy; leaves scale-like; flowers dioecious; bracts 4 to 5 mm. long, with corky appendages on the sides.

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7. **Atriplex confertifolia** (Torr.) S. Wats. Proc. Amer. Acad. 9: 119. 1874.

Obione confertifolia Torr. in Frém. Rep. Exped. Rocky Mount. 318. 1845.

Chihuahua. Northward in the United States to Oregon and South Dakota; type from Utah.

Shrub, rarely over 50 cm. high, often forming broad clumps; leaves mostly oval, entire, 1 to 2 cm. long; flowers dioecious; bracts oval or suborbicular.

8. **Atriplex lentiformis** (Torr.) S. Wats. Proc. Amer. Acad. 9: 118. 1874.

Obione lentiformis Torr. in Sitgreaves, Rep. Zuñi & Colo. 169. 1853.

Northern Sonora. Southern California to southwestern Utah; type from Arizona.

Dense shrub, 1 to 4 meters high; leaves ovate to ovate-deltoid or oblong, obtuse or rounded at apex; bracts smooth on the sides.

The Coahuilla Indians of southern California grind the seeds and boil the meal in salted water. The various species of *Atriplex* were rather important food plants among many of the Indians of the arid portions of North America. Among the Pimas of Arizona the young shoots, which have a salty flavor, were boiled and eaten. The same tribe made use of the seeds (presumably including also the bracts), cooking them in pits over night, then drying and parching them and storing for winter use. Seeds so preserved were eaten as *pinole*—a mixture of the ground seeds with water. The Pimas used the powdered root as a dressing for sores.

9. **Atriplex polycarpa** (Torr.) S. Wats. Proc. Amer. Acad. 9: 117. 1874.

Obione polycarpa Torr. U. S. Rep. Expl. Miss. Pacif. 4: 130. 1857.

Atriplex curvidens T. S. Brandeg. Proc. Calif. Acad. II. 2: 201. 1889.

Sonora and Baja California. California to Arizona; type from the Gila River, Arizona.

Dense shrub, 1 to 2 meters high; leaves rhombic or deltoid, 2 to 5 cm. long, grayish; flowers dioecious; bracts with a few subulate appendages on the sides.

10. **Atriplex insularis** Rose, Contr. U. S. Nat. Herb. 1: 80. 1890.

Islands off the west coast of Baja California; type from Raza Island.

Erect shrub, 1.5 to 2 meters high; leaves obovate or orbicular, 1 to 1.5 cm. long, short-petiolate or sessile, rounded at apex; bracts coarsely and irregularly dentate, short-tuberculate on the sides.

11. **Atriplex obovata** Moq. Chenop. 61. 1840.

Atriplex greggii S. Wats. Proc. Amer. Acad. 9: 118. 1874.

Chihuahua to Zacatecas; type from San Luis Potosí. Western Texas and southern New Mexico.

Shrub, 15 to 40 cm. high; leaves oblong to oval, 1 to 3 cm. long; flowers dioecious; bracts denticulate, the sides sparsely tuberculate or crested near the base, rarely smooth.

12. **Atriplex pringlei** Standl. N. Amer. Fl. 21: 68. 1916.

Known only from the type locality, alkaline plains, Hacienda de Angostura, San Luis Potosí.

Shrub, 20 to 30 cm. high; leaves obovate, 1.5 to 3 cm. oblong, rounded at apex; bracts not compressed, irregularly dentate, the sides with few or numerous appendages.

2. EUROTIA Adans. Fam. Pl. 2: 260. 1763.

1, **Eurotia subspinosa** Rydb. Bull. Torrey Club 39: 312. 1912.

Chihuahua and Coahuila. Southern California to Utah; type from Utah.

Much-branched shrub a meter high or less, copiously pubescent; leaves linear, alternate, 1 to 3 cm. long, stellate-pubescent; flowers dioecious, clustered in the leaf axils; fruit covered with long white or brownish hairs.

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The plant is of some importance for forage. The closely related *E. lanata* (Pursh) Moq., of the western United States, is often known as "winter-fat."

3. ALLENROLFEA Kuntze, Rev. Gen. Pl. 545. 1891.

1. **Allenrolfea occidentalis** (S. Wats.) Kuntze, Rev. Gen. Pl. 1: 546. 1891.

Halostachys occidentalis S. Wats. in King, Geol. Expl. 40th Par. 5: 293. 1871.

Spirostachys occidentalis S. Wats. Proc. Amer. Acad. 9: 125. 1874.

In alkaline soil, Sonora and Baja California; probably also in Chihuahua. Northward in the United States to Oregon; type from Utah.

Shrub, 1.5 meters high or less, much branched, green, with very succulent, fragile, jointed branches; flowers arranged spirally by 3's or 5's in the axils of fleshy peltate bracts. "Hierba del burro" (New Mexico).

Eaten sparingly by stock. Known in New Mexico as "burroweed."

4. ARTHROCNEMUM Moq. Chenop. 111. 1840.

1. **Arthrocnemum subterminale** (Parish) Standl. Journ. Washington Acad. Sci. 4: 399. 1914.

Salicornia subterminalis Parish, Erythea 6: 87. 1898.

In alkaline soil, Baja California and Sinaloa. California; type from Riverside County.

Low leafless shrub with succulent jointed branches; flowers in groups of 3 on the opposite sides of the joints, the flowering joints forming terminal spikes.

The seeds were ground into meal and eaten by the Coahuilla Indians of southern California.[1]

5. DONDIA Adans. Fam. Pl. 2: 261. 1763.

Low shrubs or herbs, glabrous or pubescent, often glaucous; leaves short, terete or semiterete, very succulent; flowers small, perfect, axillary.

The plants perhaps scarcely deserve to be classed as shrubs. They are sometimes burned to secure ashes from which lye for soap making is made. The Coahuilla Indians of California are said to use the plants for dyeing baskets black. The salty-flavored leaves were cooked and eaten by the Pimas and other Indians of the arid regions. The following names are said to be applied to various species of doubtful identification: "Romerito"; "romerillo"; "jauja" (Durango, Tamaulipas); "sosa" (Sonora); "quelite salado" (Chihuahua).

Stems and leaves glabrous or nearly so.
- Seed 1.5 to 2 mm. broad ..... 1. D. californica.
- Seed 0.8 mm. broad ..... 2. D. fruticosa.

Stems and leaves densely villous or tomentulose, at least when young.
- Branches of the inflorescence very slender, spreading or divaricate, flexuous, elongate; leaves flattened ..... 3. D. ramosissima.
- Branches of the inflorescence stout, ascending or erect, not flexuous, short; leaves terete.
  - Calyx densely pubescent ..... 4. D. brevifolia.
  - Calyx nearly or quite glabrous.
    - Leaves glaucous, 3 to 7 mm. long, rounded at apex; seed 1.5 mm. broad. 5. D. palmeri.
    - Leaves green, 7 to 15 mm. long, acute; seed 1 mm. broad. 6. D. tampicensis.

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[1] See D. P. Barrows, The ethno-botany of the Coahuilla Indians of southern California, pp. 1–82. 1900. Doctorate thesis of the University of Chicago.

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1. **Dondia californica** (S. Wats.) Heller, Cat. N. Amer. Pl. 8. 1898.
Suaeda californica S. Wats. Proc. Amer. Acad. 9: 89. 1874.
Salt marshes, coast of Baja California. California; type from San Francisco Bay.
Shrub, 20 to 80 cm. high; leaves 1.5 to 3.5 cm. long.

2. **Dondia fruticosa** (L.) Druce, List. Brit. Pl. 60. 1908.
Chenopodium fruticosum L. Sp. Pl. 221. 1753.
Suaeda fruticosa Forsk. Fl. Aegypt. Arab. 70. 1775.
Coahuila and probably elsewhere. Northward to Alberta; Bahamas and Cuba; Europe, Asia, and Africa.
Shrub, 20 to 80 cm. high; leaves 1 to 1.5 cm. long.

3. **Dondia ramosissima** Standl. N. Amer. Fl. 21: 91. 1916.
Baja California. Southern California and Arizona; type from Lees Ferry, Arizona.
Shrub, 1 meter high; leaves 0.5 to 2 cm. long.

4. **Dondia brevifolia** Standl. N. Amer. Fl. 21: 92. 1916.
Baja California. Southern California; type from Newport.

5. **Dondia palmeri** Standl. N. Amer. Fl. 21: 91. 1916.
Coahuila and Zacatecas; type from Parrás, Coahuila.
Low shrub. "Saladillo" (Zacatecas).

6. **Dondia tampicensis** Standl. N. Amer. Fl. 21: 91. 1916.
Known only from the type locality, along the coast near La Barra, Tamaulipas, near Tampico.

33. AMARANTHACEAE. Amaranth Family.

REFERENCE: Standley, Amaranthaceae, N. Amer. Fl. 21: 95–169. 1917.

Shrubs or small trees; leaves opposite or alternate, estipulate, entire; flowers small, perfect or unisexual, usually whitish, mostly spicate; fruit very small, dry.

Many herbaceous representatives of the family occur in Mexico.

Leaves opposite. Fruit 1-seeded.
Stigma capitate or shallowly bilobate. Plants scandent ..... 5. **PFAFFIA.**
Stigma with 2 or 3 subulate or filiform lobes ..... 6. **IRESINE.**
Leaves alternate.
Fruit with 2 or more seeds. Flowers perfect.
Fruit 1-seeded ..... 1. **CELOSIA.**
Sepals glabrous; anthers 4-celled.
Seeds with an aril; stems usually scandent or reclining ..... 2. **CHAMISSOA.**
Seeds without an aril; stems erect ..... 3. **LAGREZIA.**
Sepals villous; anthers 2-celled ..... 4. **DICRAURUS.**

1. CELOSIA L. Sp. Pl. 205. 1753.

Low shrubs or herbs; leaves alternate, entire or lobed, petiolate; flowers perfect, spicate.

The best-known representative of the genus is the cockscomb, *Celosia argentea* L., various forms of which are cultivated for ornament. It is known in Mexico as "cresta de gallo," "abanico," "Cinco de Mayo," and "mano de león." The cultivated plants are the form with fasciated inflorescence, described by Linnaeus as *Celosia cristata*. This is the only species besides those enumerated below which occurs in Mexico.

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Sepals 5 to 6 mm. long, prominently nerved.
  Leaf blades hastately lobed; stigmas 2 ..... 1. C. palmeri.
  Leaf blades not lobed; stigmas 3.
    Seeds 5 to 8; leaf blades ovate to lanceolate, decurrent nearly to the base of the petiole ..... 2. C. virgata.
    Seeds about 20; leaf blades deltoid to triangular-lanceolate, short-decurrent. 3. C. nitida.
Sepals 3 mm. long or less, obscurely nerved.
  Leaf blades, at least most of them, hastately lobed, puberulent beneath. 4. C. floribunda.
  Leaf blades entire, glabrous.
    Flowers pedicellate ..... 7. C. chiapensis.
    Flowers sessile.
      Fruit stipitate; sepals dark brown ..... 5. C. moquini.
      Fruit sessile; sepals stramineous ..... 6. C. orcuttii.

1. **Celosia palmeri** S. Wats. Proc. Amer. Acad. 18: 163. 1883.
Coahuila, Nuevo León, and San Luis Potosí; type from Monclova, Coahuila, Western Texas.
Low shrub, much branched, glabrous except about the inflorescence; leaves lanceolate or lance-triangular, 1.5 to 5 cm. long; spikes 1 to 2 cm. long; seeds 3 or 4.

2. **Celosia virgata** Jacq. Coll. Bot. 2: 279. 1788.
Veracruz and Yucatán. Cuba and Porto Rico; northern South America.
Plants suffrutescent, 0.5 to 1 meter high; leaves ovate or lanceolate; flower spikes 1 to 5 cm. long.

3. **Celosia nitida** Vahl, Symb. Bot. 3: 44. 1794.
San Luis Potosí to Yucatán. West Indies, western Texas, and northern South America.
Plants fruticose below, the slender stems erect or clambering over other plants, glabrous; leaves 2 to 7 cm. long. "Abanico" (Colombia).
Used in Martinique as a remedy for dysentery.

4. **Celosia floribunda** A. Gray, Proc. Amer. Acad. 5: 167. 1861.
Southern Baja California; type from the vicinity of Cape San Lucas.
Shrub, 4 meters high or less; leaves 3 to 18 cm. long; spikes 2 to 15 cm. long.

5. **Celosia moquini** Guillem.; Moq. in DC. Prodr. 13²: 239. 1849.
Southern Mexico, the localities not definitely known.
Leaves 15 to 30 cm. long; flower spikes arranged in large panicles.

6. **Celosia orcuttii** Greenm. Field Mus. Bot. 2: 330. 1912.
Colima, the type from the city of Colima.
Leaves 6 to 17 cm. long, acute.
Rather doubtfully distinct from the last species.

7. **Celosia chiapensis** T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 363. 1917.
Chiapas; type from Finca Irlanda.
Glabrous shrub; leaves slender-petiolate, lanceolate or elliptic-lanceolate, 9 to 14 cm. long, acuminate.

2. CHAMISSOA H. B. K. Nov. Gen. & Sp. 2: 196. 1817.

1. **Chamissoa altissima** (Jacq.) H. B. K. Nov. Gen. & Sp. 2: 197. 1817.
Achyranthes altissima Jacq. Enum. Pl. Carib. 17. 1762.
Sinaloa to Tamaulipas, Tabasco and Oaxaca. Central America, West Indies, and northern South America; type from Jamaica.

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Shrub, the stems 2 meters long or more, scandent or reclining, glabrous or nearly so; leaves ovate or lanceolate, 6 to 18 cm. long, acute; flowers spicate, in large panicles. "Pate" (Nicaragua); "guaniquique" (Cuba); "pabellón del rey" (Santo Domingo).

This is probably the plant described by Sessé and Mociño[1] as *Celosia alomicis*.

3. LAGREZIA Moq. in DC. Prodr. 13[2]: 252. 1849.

1. **Lagrezia monosperma** (Rose) Standl. Journ. Washington Acad. Sci. 5: 393. 1915.

Celosia monosperma Rose, Contr. U. S. Nat. Herb. 1: 352. 1895.

Colima and Guerrero; type from ~~Manzanillo, Colima~~.

Shrub, 2 to 5 meters high, glabrous or nearly so; leaves ovate to lanceolate, 5 to 12 cm. long; flowers perfect, small, in slender paniculate spikes.

4. DICRAURUS Hook. f. in Benth. & Hook. Gen. Pl. 3: 42. 1880.

Erect shrubs, copiously pubescent; leaves chiefly alternate, but some of them frequently opposite; flowers unisexual, small, spicate, the spikes paniculate.

Leaves ovate to ovate-lanceolate, acute, 3 to 9 mm. wide; petioles 1 to 2 mm. long ..... 1. D. leptocladus.

Leaves rounded-ovate or rounded-deltoid, usually rounded at the apex, 13 to 35 mm. wide; petioles 5 to 10 mm. long ..... 2. D. alternifolius.

1. **Dicraurus leptocladus** Hook. f. in Benth. & Hook. Gen. Pl. 3: 43. 1880.

Dicraurus diffusus Baill. Hist. Pl. 9: 214. 1888.

Chihuahua to San Luis Potosí. Western Texas (type locality).

Shrub, 0.2 to 1 meter high, with numerous stems.

2. **Dicraurus alternifolius** (S. Wats.) Uline & Bray, Bot. Gaz. 21: 355. 1896.

Iresine alternifolia S. Wats. Proc. Amer. Acad. 24: 72. 1889.

Shrub, 1 to 3.5 meters high, with grayish or brownish branches.

5. PFAFFIA Mart. Nov. Gen. & Sp. 2: 20. 1826.

1. **Pfaffia hookeriana** (Hemsl.) Greenm. Field Mus. Bot. 2: 330. 1912.

Hebanthe hookeriana Hemsl. Biol. Centr. Amer. Bot. 3: 19. 1882.

Veracruz, the type from Córdoba. Central America.

Scandent shrub, more or less pubescent; leaves ovate, acute, short-petiolate; flowers mostly perfect, yellowish white, spicate, the sepals covered with long white hairs.

6. IRESINE P. Br. Civ. Nat. Hist. Jam. 358. 1756.

Shrubs or small trees, erect or sometimes scandent; leaves opposite, petiolate; flowers perfect or unisexual, usually spicate, the sepals variously hairy.

A number of herbaceous species occur in Mexico. A plant described by Sessé and Mociño[2] as *Celosia dioica* belong, apparently, to this genus, but its identification is doubtful.

Flowers perfect or polygamous.

Branches of the inflorescence glabrous or nearly so.

Bracts and bractlets rounded or obtuse at the apex.

Inflorescence naked; bracts stramineous or whitish; pubescence of the sepals bright white; leaf blades broadest at the middle ..... 1. I. nigra.

Inflorescence leafy; bracts fuscous; pubescence of the sepals brownish; leaf blades broadest near the base ..... 2. I. pacifica.

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[1] Pl. Nov. Hisp. 41, 1887. The specific name is written "*Alomiris*" in Fl. Mex. 74. 1894.

[2] Pl. Nov. Hisp. 38. 1893.

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Bracts and bractlets acute or acuminate, cuspidate.
Staminodia minute; sepals acute or acutish; bracts sparsely villous. 3. I. angustifolia.
Staminodia one-third as long as the filaments; sepals obtuse or rounded at apex; bracts densely villous 4. I. arenaria.
Branches of the inflorescence densely canescent or tomentose.
Leaf blades elliptic to oblanceolate-oblong, 12 to 20 cm. long, soon glabrate; spikelets sessile; sepals sparsely lanate at base 5. I. tomentella.
Leaf blades ovate to lanceolate, 8 cm. long or less, permanently pubescent; spikelets mostly pedicellate; sepals densely lanate 6. I. hartmanii.
Flowers dioecious.
Branches of the inflorescence glabrous or nearly so.
Leaves 25 to 33 cm. long 7. I. herrerae.
Leaves 2 to 15 cm. long.
Bracts subcoriaceous, rounded at apex; lateral veins of the leaves nearly obsolete 8. I. palmeri.
Bracts scarious, mucronulate; lateral veins of the leaves coarse and prominent 9. I. interrupta.
Branches of the inflorescence densely pubescent.
Staminate spikelets glomerate at the ends of branches; leaf blades about as broad as long, mostly suborbicular 10. I. rotundifolia.
Staminate spikelets paniculate; leaf blades much longer than broad.
Sepals of the pistillate flowers rigid, green, the tips slightly spreading. 11. I. pringlei.
Sepals of the pistillate flowers thin, whitish, the tips erect or incurved.
Pubescence of branched hairs 12. I. stricta.
Pubescence of simple hairs.
Panicles on long naked peduncles, narrow, the branches usually short.
Leaves soon glabrate; pubescence of the stems lustrous. 13. I. nitens.
Leaves permanently pubescent, at least beneath; pubescence dull. 14. I. schaffneri.
Panicles short-pedunculate or usually sessile, broad, the branches commonly elongate.
Leaves white beneath with a usually dense tomentum.
Spikes usually sessile, short; leaves thick, subrugose; branches of the panicle stout 15. I. cassiniaeformis.
Spikes nearly all pedunculate, elongate; leaves thin; branches of the panicle slender, flexuous 16. I. discolor.
Leaves not white beneath, the pubescence of yellowish, straight or loosely matted hairs.
Panicles very dense; bracts and sepals villous only at base; sepals of the staminate flowers 2.5 to 3 mm. long. 17. I. grandis.
Panicles loose and open; bracts and sepals copiously villous; sepals of the staminate flowers 2 mm. long or shorter. 18. I. calea.

1. **Iresine nigra** Uline & Bray, Bot. Gaz. 21: 350. 1896.

Veracruz and Chiapas. Central America; type from San Pedro Sula, Honduras.

Shrub with slender branches; leaves mostly ovate, 4.5 to 14 cm. long, acute to long-acuminate, glabrous.

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2. **Iresine pacifica** Standl. Contr. U. S. Nat. Herb. 18: 96. 1916.
Sinaloa to Colima; type from Manzanillo.
Slender erect shrub, or often herbaceous, nearly glabrous; leaves ovate or lanceolate, 4 to 10 cm. long.

3. **Iresine angustifolia** Euphrasén, Beskr. St. Barthel. 165. 1795.
Iresine elatior Rich.; Willd. Sp. Pl. 4: 766. 1805.
Veracruz; Baja California. West Indies; Costa Rica to Brazil and Ecuador; type from St. Bartholomew Island, West Indies.
Much-branched shrub, a meter high, or often herbaceous, nearly glabrous; leaves mostly lanceolate, 5 to 10 cm. long.

4. **Iresine arenaria** Standl. Contr. U. S. Nat. Herb. 18: 93. 1916.
Sinaloa, on sandy hillsides, the type from Topolobampo.
Plants erect, fruticose at base, nearly glabrous; leaves mostly lanceolate, 2.5 to 4.5 cm. long.

5. **Iresine tomentella** Standl. Contr. U. S. Nat. Herb. 18: 97. 1916.
Known only from the type locality, Gómez Farias, Tamaulipas.
Erect shrub, 1.5 to 2 meters high, with white flowers. "Tepozán."

6. **Iresine hartmanii** Uline, Field Mus. Bot. 1: 422. 1899.
Sonora and Durango; type from Granados, Sonora.
Shrub, 1.5 to 2.5 meters high.

7. **Iresine herrerae** Blake, Contr. Gray Herb. n. ser. 53: 55. 1918.
Known only from the type locality, Río Concordia, Oaxaca.
Erect shrub, 3 meters high, glabrous.

8. **Iresine palmeri** (S. Wats.) Standl. Journ. Washington Acad. Sci. 5: 395. 1915.
Hebanthe palmeri S. Wats. Proc. Amer. Acad. 18: 144. 1883.
Nuevo León to Veracruz; type from Guajuco, Nuevo León.
Scandent or decumbent shrub, nearly glabrous; leaves mostly ovate-oblong, 2 to 6 cm. long.

9. **Iresine interrupta** Benth. Bot. Voy. Sulph. 156. 1844.
Alternanthera richardii Moq. in D. C. Prodr. 13²: 353. 1849.
Hebanthe subnuda Hemsl. Biol. Centr. Amer. Bot. 3: 20. 1882.
Sonora to San Luis Potosí, Veracruz, and Puebla; type from Tepic. Guatemala.
Scandent or reclining shrub, 4 to 6 meters long, nearly glabrous, with pale stems; leaves broadly ovate or lanceolate, acute or attenuate. "Barba del viejo" (Sinaloa).

10. **Iresine rotundifolia** Standl. Contr. U. S. Nat. Herb. 18: 96. 1916.
Puebla; type from San Luis Tultitlanapa.
Leaves 3.5 to 17 mm. long, tomentose beneath.

11. **Iresine pringlei** S. Wats. Proc. Amer. Acad. 25: 161. 1890.
On rocky slopes, Jalisco to Puebla and Oaxaca; type from Guadalajara.
Erect shrub, 1.5 to 3 meters high; leaves ovate, 4 to 8 cm. long, acuminate; flowers in large panicles.

12. **Iresine stricta** Standl. Contr. U. S. Nat. Herb. 18: 97. 1916.
Puebla and Oaxaca; type from Tehuacán, Puebla.
Erect shrub, 30 to 80 cm. high; leaves oval to ovate, 1.3 to 3.5 cm. long.

13. **Iresine nitens** Standl. Contr. U. S. Nat. Herb. 18: 95. 1916.
Known only from the type locality, Tehuacán, Puebla.
Low erect shrub; leaves lanceolate, 2 to 6 cm. long, acute.

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14. Iresine schaffneri S. Wats. Proc. Amer. Acad. **21**: 437. 1886.

Dry rocky hillsides, Chihuahua to San Luis Potosí, and Hidalgo; type from San Luis Potosí.

Erect shrub, 1 meter high or less; leaves ovate or lanceolate, 2 to 9 cm. long. "Tlatlón" (Querétaro).

15. Iresine cassiniaeformis Schauer, Linnaea **19**: 708. 1847.

Tamaulipas and San Luis Potosí.

Erect shrub, 1 to 1.5 meters high; leaves mostly ovate, acute or obtuse.

16. Iresine discolor Greenm. Proc. Amer. Acad. **33**: 477. 1898.

Puebla and Oaxaca; type from Santa Catarina Canyon, Oaxaca.

Erect shrub with slender branches; leaves oval, ovate, or oblong, 2 to 7 cm. long.

17. Iresine grandis Standl. N. Amer. Fl. **21**: 163. 1917.

Jalisco to San Luis Potosí, Veracruz, Mexico, and Michoacán; type from Las Canoas, San Luis Potosí. Guatemala.

Shrub, 1.5 to 3 meters high; leaves ovate, 6 to 13 cm. long.

18. Iresine calea (Ibáñez) Standl. Contr. U. S. Nat. Herb. **18**: 94. 1916.

Gomphrena latifolia Mart. & Gal. Bull. Acad. Brux. **10**[1]: 349. 1843.

Achyranthes calea Ibáñez, Naturaleza **4**: 79. 1879.

Iresine latifolia Benth. & Hook. Gen. Pl. **3**: 42. 1880. Not *I. latifolia* D. Dietr. 1839.

Hebanthe mollis Hemsl. Biol. Centr. Amer. Bot. **3**: 20. 1882.

Iresine laxa S. Wats. Proc. Amer. Acad. **21**: 454. 1886.

Baja California to Coahuila, Tamaulipas, and Chiapas; type from Puebla. Central America.

Erect shrub, 1.5 to 6.5 meters high; leaves ovate, 4 to 10 cm. long. "Tepozán" (Tamaulipas); "amargosillo" (Michoacán, Guerrero); "pié de paolma" (Valley of Mexico, *Ramírez*); "tlatlancuaya," "hierba del tabardillo," "hierba de la calentura" (Puebla); "mosquitero" (El Salvador). Robelo gives one of the Mexican names as "clacancauayo" derived from the Nahuatl *tlatiancua-ye*, "which has knees," referring to the jointed stems.

Reputed to have diuretic and diaphoretic properties; decoction of the plant used in Puebla in the treatment of fevers.

34. ALLIONIACEAE. Four-o'clock Family.

REFERENCE: Standley, Allioniaceae, N. Amer. Fl. **21**: 171–254. 1918.

Shurbs or trees, sometimes scandent; leaves opposite (in the genera listed here), entire; flowers small and usually inconspicuous; corolla none.

Many herbaceous representatives of the family occur in Mexico. *Bougainvillea spectabilis* Willd., a native of Brazil, is a favorite ornamental plant in Mexico. It is a tall spiny climber with alternate leaves, the small flowers being borne on large, showy, purplish red bracts. It is known in Mexico by the following names: "Azalea de guía," "bugambilla," "bugevilla," "bombilla," "bugavilea," "hernandiazéa," "camelina." Another well-known cultivated plant of the family is the four-o'clock, *Mirabilis jalapa* L., known in Mexico as "arrebolera," "maravilla," "Don Diego de noche," and "trompetilla."

Fruit bearing short-stalked glands.
- Plants armed with spines; flowers in cymes ..... 3. PISONIA.
- Plants unarmed; flowers in umbels.
  - Plants erect; stamens 6 to 11 ..... 4. PISONIELLA.
  - Plants scandent or trailing; stamens 2 to 5 ..... 5. COMMICARPUS.

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Fruit without glands.
  Fruit with longitudinal wings; low shrubs.....6. **SELINOCARPUS.**
  Fruit not winged; trees or large shrubs.
    Stamens included.....1. **NEEA.**
    Stamens exserted.....2. **TORRUBIA.**

1. NEEA[1] Ruiz & Pav. Fl. Peruv. Chil. Prodr. 52. 1794.

Leaves sometimes verticillate; flowers dioecious; staminate perianth urceolate, 4 or 5-dentate; stamens 5 to 10; fruit ellipsoid.

Leaves coriaceous, opposite.....1. **N. choriophylla.**
Leaves membranaceous.
  Leaves mostly 2 to 6 cm. wide; stamens 5.....2. **N. psychotrioides.**
  Leaves less than 2 cm. wide; stamens 6.
    Leaves partly verticillate, acuminate at apex.....3. **N. tenuis.**
    Leaves opposite, obtuse or acutish.....4. **N. sphaerantha.**

1. **Neea choriophylla** Standl. Contr. U. S. Nat. Herb. **13**: 384. 1911.
  Yucatán.
  Leaf blades oval to obovate-oval, 4.5 to 7 cm. long, abruptly acuminate; perianth 3 mm. long.

2. **Neea psychotrioides** Donn. Smith, Bot. Gaz. **16**: 199. 1891.
  Tabasco and Oaxaca. Guatemala (type from Escuintla) to Costa Rica.
  Slender shrub, 2 to 3 meters high; leaves opposite or verticillate, oblong to elliptic, 8 to 15 cm. long, glabrous; perianth 4 to 8 mm. long.

3. **Neea tenuis** Standl. Contr. U. S. Nat. Herb. **13**: 384. *pl.* 74. 1911.
  Known only from the type locality, Orizaba, Veracruz.
  Leaf blades elliptic-oblong or lance-elliptic, 4.4 to 5 cm. long; perianth 3 to 4 mm. long.

4. **Neea sphaerantha** Standl. Contr. U. S. Nat. Herb. **13**: 384. 1911.
  Known only from the type locality, Izamal, Yucatán.
  Leaves oblong or oval, 1 to 2 cm. wide, glabrous; perianth 4 to 5 mm. long.

2. TORRUBIA Vell. Fl. Flum. 139. 1827.

Shrubs or small trees; flowers small, dioecious; fruit small, drupaceous.

Inflorescence lax, few-flowered; leaf blades oval or oblong-oval.....1. **T. potosina.**
Inflorescence dense, many-flowered; leaf blades elliptic.....2. **T. linearibracteata.**

1. **Torrubia potosina** Standl. Contr. U. S. Nat. Herb. **18**: 99. 1916.
  Known only from the type locality, Rascón, San Luis Potosí.
  Leaves 5 to 10.5 cm. long, acute or acuminate.

2. **Torrubia linearibracteata** (Heimerl) Standl. Contr. U. S. Nat. Herb. **18**: 100. 1916.
  Pisonia linearibracteata Heimerl, Repert. Sp. Nov. Fedde **12**: 221. 1913.
  Yucatán; type from Chichen Itzá.
  Leaves 7.5 cm. long and 4.3 cm. wide or smaller.

3. PISONIA[2] L. Sp. Pl. 1026. 1753.

Flowers small, dioecious, cymose; fruit 5-sided, puberulent, with stalked glands along the angles.

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[1] The genus was named in honor of Luis Née, a Frenchman by birth but a Spaniard by naturalization, who was an associate of Malaspina on his voyage around the world (1789–1794). He collected chiefly in South America, but also visited Mexico, landing at Acapulco and journeying to the capital, in company with Haenke. His collections are at Madrid.

[2] Named in honor of Willem Piso, a Dutch physician and naturalist, who visited Brazil in 1637.

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Mature fruit 7 to 10 mm. thick.....1. P. macranthocarpa.
Mature fruit 3 to 4 mm. thick.
Staminate flowers yellowish green, in loose open cymes 2.5 to 6 cm. broad. 2. P. aculeata.
Staminate flowers dark red, in compact headlike cymes 1 to 2.2 cm. broad.
Leaf blades acute or acutish, obovate or oblong-obovate, nearly glabrous; spines straight.....3. P. flavescens.
Leaf blades rounded or obtuse at apex, orbicular or rounded-obovate, densely pubescent; spines usually recurved.....4. P. capitata.

1. **Pisonia macranthocarpa** Donn. Smith, Bot. Gaz. 20: 293. 1895.
Pisonia aculeata macranthocarpa Donn. Smith, Bot. Gaz. 16: 198. 1891.
Chiapas. Central America, Venezuela, and Cuba; type from Escuintla, Guatemala.
Shrub or small tree with reddish brown branches, armed with few, usually straight spines; leaves elliptic to broadly oval; flowers greenish yellow; fruit 1 to 2 cm. long.

2. **Pisonia aculeata** L. Sp. Pl. 1026. 1753.
Tamaulipas to Sinaloa and southward, ~~chiefly along sea beaches~~. Southern Florida, West Indies, Central America, tropical South America, and southern Asia.
Densely branched shrub, often with a thick trunk, the branches long and drooping or subscandent, very spiny; leaves mostly 3 to 10 cm. long. variable in shape; flowers sweet-scented; fruit 9 to 12 cm. long. "Beeb" or "hbeeb" (Yucatán, Maya) "garabato" (Durango); "garabato prieto," "uña del diablo" (Michoacán, Guerrero); "coma de uña" (Tamaulipas); "uña de gato" (Tabasco, Cuba, Santo Domingo, Porto Rico); "huele de noche" (Oaxaca, Guatemala); "espino y camote" (Oaxaca or Chiapas, *Seler*); "gu-ichi-gu" (Oaxaca, *Seler*); "zarza" (Cuba); "escambrón" (Porto Rico); "espino negro" (Nicaragua).
The branches are said to be used in Jamaica for barrel hoops. A decoction of the leaves and bark is used in Yucatán, Jamaica, and elsewhere for rheumatism and venereal diseases. The glands of the fruit are extremely viscid, and in herbarium specimens they retain their viscidity indefinitely. The fruits adhere easily to the feathers of birds, sometimes in such abundance as to prevent their flying.

3. **Pisonia flavescens** Standl. Contr. U. S. Nat. Herb. 13: 389. 1911.
Extreme southern Baja California; type from San José del Cabo.
Branches slender, gray; leaves 4 to 6.5 cm. long; fruit about 1 cm. long.

4. **Pisonia capitata** (S. Wats.) Standl. Contr. U. S. Nat. Herb. 13: 388. 1911.
Cryptocarpus capitatus S. Wats. Proc. Amer. Acad. 24: 71. 1889.
In sandy soil, Sonora to Tepic; type from Guaymas, Sonora.
Densely branched shrub or small tree, sometimes 5 meters high, branched to the ground or often with a distinct trunk; leaves 2 to 6 cm. long; fruit 7 to 10 mm. long. "Bainoro prieto," "vainoro prieto," "garabato prieto" (Sinaloa); "garambullo" (Sonora, Sinaloa).
A decoction of the fruit is said to be used for fevers.

4. **PISONIELLA** (Heimerl) Standl. Contr. U. S. Nat. Herb. 13: 385. 1911.

1. **Pisoniella arborescens** (Lag. & Rodr.) Standl. Contr. U. S. Nat. Herb. 13: 385. 1911.
Boerhaavia arborescens Lag. & Rodr. Anal. Cienc. Nat. 4: 257. 1801.

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Pisonia hirtella H. B. K. Nov. Gen. & Sp. 2: 217. 1818.
Pisonia mexicana Willd.; Link, Enum. Pl. 1: 354. 1821.
Boerhaavia octandra S. Wats. Proc. Amer. Acad. 26: 145. 1891.
Pisonia arborescens Kuntze, Rev. Gen. Pl. 3²: 265. 1898.

Jalisco to Veracruz and Oaxaca; type from Salvatierra, Guanajuato.

Shrub, 2 meters high or less; leaves broadly ovate or ovate-orbicular, 2.5 to 7 cm. long, obtuse or acute; flowers perfect, greenish white, 5 to 7 mm. long; fruit dry, about 1 cm. long. "Jazmincillo" (Valley of Mexico, etc.)

5. **COMMICARPUS** Standl. Contr. U. S. Nat. Herb. 12: 373. 1909.

Plants fruticose or suffrutescent, more or less scandent; flowers perfect, umbellate or verticillate, small; fruit dry, cylindric, with very viscid glands.

Perianth 3 mm. long and broad, glabrous or obscurely puberulent; glands of the fruit irregularly scattered ..... 1. C. scandens.
Perianth 7 to 8 mm. long, 10 mm. broad, short-villous or hirtellous; glands of the fruit grouped in transverse bands ..... 2. C. brandegei.

1. **Commicarpus scandens** (L.) Standl. Contr. U. S. Nat. Herb. 12: 373. 1909.
Boerhaavia scandens L. Sp. Pl. 3. 1753.

Nearly throughout Mexico, in fencerows and waste ground. Western Texas and southern Arizona; West Indies; South America; type from Jamaica.

Leaves cordate-ovate or ovate-deltoid, 1.5 to 6.5 cm. long, acute; flowers greenish yellow; fruit about 1 cm. long. "Bejuco de purgación" (Porto Rico); "sonorita" (Sinaloa).

A decoction of the roots is said to be used in Porto Rico for venereal diseases.

2. **Commicarpus brandegei** Standl. Contr. U. S. Nat. Herb. 12: 374. 1909.
Boerhaavia elongata T. S. Brandeg. Proc. Calif. Acad. II. 2: 199. 1889. Not *B. elongata* Salisb. 1796.

Southern Baja California; type from San Pablo.

Plants 2 meters long or more, with whitish stems; flowers white.

6. **SELINOCARPUS** A. Gray, Amer. Journ. Sci. II. 15: 262. 1853.

Low shrubs, more or less pubescent; flowers perfect, solitary in the leaf axils.

Several herbaceous species also occur in Mexico.

Perianth 1 cm. long. Leaves linear or linear-oblong ..... 1. S. angustifolius.
Perianth 2.5 to 3.5 cm. long.
Leaves linear, 1 to 4 cm. long, obscurely glandular-puberulent or glabrous. 2. S. palmeri.
Leaves narrowly spatulate-oblong, 0.4 to 1.1 cm. long, densely glandular-hirtellous ..... 3. S. purpusianus.

1. **Selinocarpus angustifolius** Torr. U. S. & Mex. Bound. Bot. 170. 1859.

Coahuila. Western Texas, the type from Presidio del Norte.

Plants fruticose below, 10 to 40 cm. high; flowers often cleistogamous; fruit 5.5 to 7.5 mm. long, with 5 thin wings.

2. **Selinocarpus palmeri** Hemsl. Biol. Centr. Amer. Bot. 3: 6. 1882.

Known only from the type locality, San Lorenzo de Laguna, Coahuila.

Flowers 3.5 cm. long, the stamens long-exserted.

3. **Selinocarpus purpusianus** Heimerl, Oesterr. Bot. Zeitschr. 63: 353. 1913.

Known only from the type locality, Sierra del Rey, Coahuila.

Shrub, 10 to 20 cm. high; flowers 2.5 to 3 cm. long.

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35. BATIDACEAE.

1. BATIS L. Syst. Nat. ed. 10. 1380. 1759.

1. **Batis maritima** L. Syst. Nat. ed. 10. 1380. 1759.

On seacoasts, Tamaulipas to Yucatán; Baja California and Sonora to Colima and probably to Chiapas. Widely distributed in tropical America; Hawaii.

Erect or prostrate shrub, sometimes a meter high; leaves opposite, fleshy, semiterete, 1 to 2.5 cm. long; flowers small, dioecious, in short axillary spikes. "Lechuga de mar" (Nicaragua); "barrilla" (Porto Rico).

The leaves have a salty flavor and have been eaten as a salad. In the West Indies ashes of the plant have been used in the manufacture of soap and glass. Descourtilz reports that the leaves were used in the treatment of ulcers, and that they have aperitive and diuretic properties.

36. PHYTOLACCACEAE. Pokeweed Family.

REFERENCE: Walter in Engl. Pflanzenreich IV. 88. 1909.

Shrubs or small trees; leaves alternate, entire; flowers small, perfect or unisexual; corolla usually none.

A number of herbaceous species of other genera occur in Mexico. It may be that some of the Mexican species of *Phytolacca* become shrubs, but the writer has seen no conclusive evidence to this effect.

Petals 5; aril of the seed large. Fruit a capsule, 1 to 5-seeded. 1. STEGNOSPERMA.

Petals none; aril small or none.
- Ovary semi-inferior; leaves cordate. Plants scandent; fruit dry, 1-seeded. 2. AGDESTIS.
- Ovary superior; leaves not cordate.
  - Perianth 5-parted. Fruit baccate 3. ACHATOCARPUS.
  - Perianth 4-parted.
    - Pedicels ebracteolate; branches spinose 4. PHAULOTHAMNUS.
    - Pedicels bracteolate; branches not spinose.
      - Fruit dry; flowers subsessile, appressed to the rachis. 5. PETIVERIA.
      - Fruit baccate; flowers pedicellate, not appressed.
        - Plants erect; stamens 4 6. RIVINA.
        - Plants scandent; stamens 8 to many 7. TRICHOSTIGMA.

1. STEGNOSPERMA Benth. Bot. Voy. Sulph. 17. 1844.

1. **Stegnosperma halimifolium** Benth. Bot. Voy. Sulph. 17. 1844.

Baja California and Sonora to Oaxaca and Veracruz; type from Baja California. Guatemala and Nicaragua; Cuba, Jamaica, and Hispaniola.

Glabrous shrub, 1 to 3.5 meters high; leaves obovate or elliptic; flowers perfect, racemose, green tinged with red. "Amole" (Baja California); "bledo carbonero" (Cuba).

The powdered root is used in Baja California as a substitute for soap. The plant has the reputation of being a cure for hydrophobia. It grows at low elevations, usually near the seacoast. The flowers are borne at nearly all times of the year.

2. AGDESTIS Moc. & Sessé; DC. Reg. Veg. Syst. 1: 543. 1818.

1. **Agdestis clematidea** Moc. & Sessé; DC. Reg. Veg. Syst. 1: 543. 1818.

Nuevo León to Veracruz and Oaxaca. Western Texas; Guatemala; reported from the West Indies and Brazil, but probably cultivated there.

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Plants scandent, the stems mostly herbaceous; root large, turnip-shaped; leaves rounded-cordate; flowers white, showy, with a slight fetid odor, arranged in paniculate racemes. "Hierba del indio" (Tamaulipas); "tripas de Judas" (Oaxaca, *Reko*). Walter reports the name "thusch" from Mexico. Palmer states the roots weigh as much as six pounds.

3. ACHATOCARPUS Triana, Ann. Sci. Nat. IV. 9: 45. 1858.

Trees or shrubs; flowers small, dioecious; perianth 5-lobed; stamens 10 to 20; fruit baccate.

Leaves densely pubescent beneath ..... 1. A. oaxacanus.
Leaves glabrous.
  Branchlets aculeate ..... 2. A. gracilis.
  Branchlets unarmed ..... 3. A. mexicanus.

1. **Achatocarpus oaxacanus** Standl., sp. nov.

Type collected between Jamiltepec and Río Verde, Oaxaca (*Nelson* 2358; U. S. Nat. Herb. no. 569298).

Branches puberulent, armed with slender spines 6 mm. long or less; leaves short-petiolate, obovate-oblong or elliptic-oblong, 5.5 to 6.5 cm. long, 2.5 to 3.5 cm. wide, obtuse or rounded at apex, acute to attenuate at base, glabrate above, densely pubescent beneath along the costa; racemes numerous, few-flowered, 2.5 cm. long, or less, the rachis puberulent, the pedicels 1 to 2 mm. long; sepals 2 mm. long, obovate to suborbicular, rounded at apex, minutely puberulent or glabrate; fruit 3 mm. in diameter, glabrous.

2. **Achatocarpus gracilis** H. Walt. in Engl. Pflanzenreich IV. 83: 137. *f. 41.* 1909.

Known only from the type locality, Petatlán, Guerrero, altitude 50 meters.

Glabrous tree with slender brown branches, armed with straight spines; leaves obovate-lanceolate, 6 cm. long, obtuse; flowers small, paniculate.

3. **Achatocarpus mexicanus** H. Walt. in Engl. Pflanzenreich IV. 83: 139. 1909.

Veracruz and Chiapas; type collected between Tapana and La Junta, Chiapas.

Shrub or tree, glabrous, unarmed; leaves elliptic, 8.5 cm. long; flowers racemose.

4. PHAULOTHAMNUS A. Gray, Proc. Amer. Acad. 20: 294. 1885.

1. **Phaulothamnus spinescens** A. Gray, Proc. Amer. Acad. 20: 294. 1885.

Baja California, Sonora (type locality), and Sinaloa.

Erect glabrous shrub, 1 to 2.5 meters high, with gray branches; leaves oblanceolate, about 1.5 cm. long; flowers small, in short racemes.

5. PETIVERIA L. Sp. Pl. 342. 1753.

1. **Petiveria alliacea** L. Sp. Pl. 342. 1753.

Petiveria octandra L. Sp. Pl. ed. 2. 486. 1762.

Petiveria hexandria Sessé & Moc. Fl. Mex. 98. 1894.

Baja California to Jalisco, Chiapas, Yucatán, and Veracruz. Widely distributed in tropical America; type from Jamaica.

Suffrutescent, about a meter high, or often wholly herbaceous, with a strong odor of garlic; leaves ovate or elliptic, with minute stipules; flowers small, pink, white, or green, in long slender interrupted spikelike racemes. "Zorrillo" (Tabasco, Yucatán, Sinaloa, Nicaragua, Michoacán, Guerrero); "hierba de las gallinitas" (Oaxaca, Yucatán); "pay-ché," "xpay-ché" (Yucatán, Maya; "skunk-plant"); "anamú" (Cuba, Porto Rico, Panama, Colombia, Santo Domingo); "apazote de zorro" (Guatemala); "hispasina" (Guatemala); "ipacina" (Nicaragua).

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Known in Jamaica as "guinea-hen weed." Probably as a result of its strong and characteristic odor, the plant has been much used in domestic medicine. It is reputed to have diuretic, sudorific, expectorant, antispasmodic, and depurative properties, and has been used as a vermifuge, emmenagogue, and abortefacient, and for toothache (the roots inserted in cavities in the teeth), fevers, rheumatism, paralysis, venereal diseases, hysteria and other nervous diseases, hydrophobia, and scorpion stings. Palmer's notes indicate that in Sinaloa the leaves are bound upon the forehead to relieve headache, and that the powdered roots are used as a snuff for nasal catarrh. It is stated that when cows eat the plant an alliaceous flavor is imparted to their milk. Descourtilz reports that in the West Indies the roots were placed among woolen goods to protect them from insects.

6. RIVINA L. Sp. Pl. 121. 1753.

1. **Rivina humilis** L. Sp. Pl. 121. 1753.

Rivina laevis L. Mant. Pl. 1: 41. 1767.

Nearly throughout Mexico. Widely distributed in tropical America.

Suffrutescent, up to 1 meter high, sometimes wholly herbaceous; leaves petiolate, ovate, acute or acuminate, bright green; flowers small, white or greenish, racemose; fruit a small, 1-seeded, red or orange berry. "Coral" (various localities); "coralito," "coralillo" (Durango); "hierba mora," "saca-tinta," "coralillo," "coralillo carmín" (Nicaragua); "carmín" (Colombia, Porto Rico); "ojo de ratón," "coralitos" (Cuba); "pimpín," "pinta-pinta" (Colombia); "sangre de toro" (Argentina, Uruguay); "caimancillo" (Santo Domingo).

The fruit is full of blood-red juice, which yields a red dye. The leaves are said to be used for catarrh and for treating wounds. The fruit is reported to be edible. Sometimes known as "rouge-plant."

R. portulaccoides Nutt., with slightly larger flowers, and *R. purpurascens* Schrad., with purplish flowers in long stiff racemes, are recognized by Walter as distinct species, but they do not appear to differ essentially from the common form.

7. TRICHOSTIGMA A. Rich. Pl. Vasc. Cub. 1: 627. 1845.

1. **Trichostigma octandrum** (L.) H. Walt. in Engl. Pflanzenreich IV. 83: 109. 1909.

Rivina octandra L. Cent. Pl. 2: 1756.

Villamilla octandra Benth. & Hook. Gen. Pl. 3: 81. 1880.

Sinaloa to Tamaulipas, Tabasco, and Chiapas. Widely distributed in tropical America.

Scandent shrub, sometimes 5 meters long; leaves elliptic or ovate, acute, petiolate; flowers small, whitish or purplish, racemose; fruit a small black 1-seeded berry. "Bejuco de paloma" (Porto Rico); "guacamayo" (Colombia); "sotacaballo" (Costa Rica); "bejuco canasta," "guaniquí" (Cuba); "pabellón del rey" (Santa Domingo).

The leaves have been used in Colombia for the treatment of wounds, and the stems in Jamaica for barrel hoops.

37. PORTULACACEAE. Portulaca Family.

Some of the species of *Talinum* should prehaps be classed as shrubs.

1. TALINOPSIS A. Gray, Pl. Wright. 1: 14. 1852.

1. **Talinopsis frutescens** A. Gray, Pl. Wright. 1: 15. *pl. 3.* 1852.

Chihuahua to San Luis Potosí and Puebla. Western Texas (type locality) and southern New Mexico.

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Brittle erect shrub, 60 cm. high or less; leaves opposite, linear, fleshy; flowers in terminal cymes; fruit a capsule.

38. RANUNCULACEAE. Buttercup Family.

Many herbaceous representatives of the family occur in Mexico.

1. CLEMATIS L. Sp. Pl. 543. 1753.

Scandent shrubs; leaves opposite, pinnate; flowers often showy; fruit of achenes, each with a long hairy tail.

Several Asiatic species of *Clematis* are frequent in cultivation as ornamental vines, and some of them are grown in Mexico. Ramírez reports the name "sacamecate" as used in Hidalgo for some unidentified native species.

Flowers solitary; sepals erect, purplish ..... 1. C. pitcheri.
Flowers paniculate; sepals spreading, white.
  Flowers polygamo-dioecious, the staminate and pistillate borne upon the same plant.
    Leaflets 3, mostly 4.5 to 9 cm. long, long-acuminate ..... 2. C. pubescens.
    Leaflets normally 5 or 7, usually less than 3.5 cm. long, obtuse or acutish. 3. C. pauciflora.
  Flowers dioecious.
    Leaflets all or partly 3-lobed or parted ..... 4. C. drummondii.
    Leaflets entire or dentate or very shallowly-lobed.
      Leaflets entire, very densely yellow-sericeous ..... 5. C. rufa.
      Leaflets entire or dentate, if entire, never densely sericeous.
        Leaflets entire or with a few narrow acute teeth, glabrous or thinly sericeous beneath, usually rounded at base ..... 6. C. dioica.
        Leaflets with few or numerous broad, obtuse or rounded teeth, often densely sericeous or pilose beneath, frequently cordate at base.
          Leaflets large, mostly 6 to 10 cm. long, usually densely pilose or sericeous beneath ..... 7. C. grossa.
          Leaflets mostly less than 4 cm. long, thinly sericeous or glabrate beneath ..... 8. C. ligusticifolia.

1. **Clematis pitcheri** Torr. & Gray, Fl. N. Amer. 1: 10. 1839.
   Clematis filifera Benth. Pl. Hartw. 285. 1848.
   Clematis filifera incisa Hemsl. Biol. Centr. Amer. Bot. 1: 2. 1879.
   Clematis pitcheri filifera Robinson in A. Gray, Syn. Fl. 1[1]: 6. 1895.
   Viorna pitcheri Britton in Britt. & Brown, Illustr. Fl. ed. 2. 2: 123. 1913.
   Coahuila to Sinaloa and Hidalgo. Texas to Nebraska and Indiana.

   Shrub with reddish stems, sparsely pubescent; leaflets ovate, with prominent veins, acute or acutish; flowers about 2.5 cm. long, with thick leathery sepals. "Barba de viejo" (Sinaloa).

   The specimens are somewhat variable, but apparently they represent a single species. This plant is reported by Sessé and Mociño[1] as *Clematis viorna*, a species native of the eastern United States.

2. **Clematis pubescens** Benth. Pl. Hartw. 5. 1839.
   Guanajuato (type locality) to Oaxaca.

   Leaflets 5 to 9 cm. long, long-acuminate, sparsely dentate or entire; sepals about 8 mm. long.

3. **Clematis pauciflora** Nutt.; Torr. & Gray, Fl. N. Amer. 1: 9. 1838.
   Baja California; reported from Sonora. California.

   Plants nearly glabrous; sepals about 2 cm. long; achenes glabrous.

   A specimen from western Chihuahua probably belongs here also.

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[1] Pl. Nov. Hisp. ed. 2. 85. 1893.

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4. Clematis drummondii Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Clematis nervata Benth. Pl. Hartw. 5. 1839.

Tamaulipas and San Luis Potosí to Baja California and Sinaloa. Texas (type locality) to Arizona.

Plants copiously pubescent, scandent over other shrubs; leaflets usually small and narrow, rarely over 3 cm. long, attenuate, usually deeply lobed; sepals 8 to 14 mm. long, white. "Barba de chivo" (Chihuahua, Coahuila, Zacatecas, Tamaulipas, etc.); "hierba de los avaros" (San Luis Potosí, *Safford*).

Very variable in pubescence and leaf form, but none of the forms seem specifically distinct.

5. Clematis rufa Rose, Contr. U. S. Nat. Herb. 10: 95. 1906.

Known only from the type locality, between Tenejapa and Yatalón, Chiapas.

The plant differs from *C. grossa* only in its entire leaflets, and additional material is necessary to determine its claim to specific rank. This and the following species are very closely related, and it is probable that they are all forms of a single one, *C. dioica*.

6. Clematis dioica L. Syst. Nat. ed. 10. 1084. 1759.

Clematis americana Mill. Gard. Dict. ed. 8. *Clematis* no. 14. 1768.

Clematis acapulcensis Hook. & Arn. Bot. Beechey Voy. 410. 1841.

Clematis grahami Benth. Pl. Hartw. 5. 1839.

San Luis Potosí to Sinaloa, Chiapas, and Yucatán. West Indies, Central America, and South America.

Very variable in pubescence and shape of the leaflets; flowers often in large showy panicles; fruit conspicuous because of the feathery tails, these 3 to 6 cm. long. "Cabeza de vieja" (Chiapas); "barba de viejo" (Tabasco, Michoacán, Valley of Mexico, Costa Rica, Guatemala, Nicaragua); "barbas de chivo" (Michoacán, etc.); "barba de chivato" (Nuevo León); "barbas de gato" (Mexico); "chilillo" (Michoacán); "chilillo de cerro" (Hidalgo); "cabellos de ángel" (Guatemala, Costa Rica, Cuba, Porto Rico); "crespillo" (Nicaragua).

Known in Jamaica as "virgin's-bower" and "traveler's joy." The stems contain a coarse fiber and are used occasionally as a substitute for twine. The leaves of this and other species have an acrid flavor; crushed and applied to the skin they are rubefacient and finally vesicant, and because of this property they are used in domestic medicine. The dried leaves lose their acrid properties. An ointment made with the leaves is used for cutaneous diseases. An infusion of the flowers and leaves is employed as a cosmetic, for removing freckles and other blemishes from the skin. The plant is said to be poisonous to cattle, and the root to have purgative properties.

In spite of the variability exhibited, it seems impossible to divide the ample material at hand into groups characterized by any constant or important character. Specimens referred by Hemsley to *C. flammulastrum* Griseb. belong here, as well as material referred to *C. caripensis* H. B. K. and *C. sericea* H. B. K.

Clematis dioica or a closely related species is figured and described by Hernández[1] under the heading, "De *Cocoztamatl*, seu luteo *tamatli*, Urinaria mirabili." His account, in part, is as follows:

"*Cocoztamatl*, which some call *Cocoztic*, *Cocoztin*, or *Cocoztli*, is a climbing shrub, having a thick pale root, whence the name. The stems are smooth, slender, and round; the leaves sinuous and divided into three points. The flowers are white, of moderate size, very like those of *Izquixochitl*, and from them there spring berries, not unlike cherries, but white in color. The root is pale and

[1] Thesaurus 118. 1651.

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inodorous, its taste slimy, of moderate temper or slightly inclined to coldness and humidity. It is a wonderful diuretic, expels phlegm, and removes all urinary obstructions."

The name "cocoztamatl" ("yellow tomato," of no application to the plant) is doubtless incorrect, and should be rather "cocotemecatl" ("pungent-vine"), as is indicated by Hernández's second account[1] of the plant, which also is accompanied by a figure. The description of the fruit, of course, is erroneous. The second account is headed "De Cocotemecatl, seu fune volubili acri," and is as follows:

"*Cocotemecatl*, which some call *Cocotemecaxihuitl*, is an herb with leaves like those of basil [*Ocimum*], but much larger, angled, and crenate. The stem is purplish and climbing; the flowers are small, borne on the ends of hairy branchlets, and they change into purplish white pappus; the roots are fibrous. It grows at Yacapichtlan and Quauhquechollan, in hot and rocky places. The leaves, which are glutinous, if crushed and taken in the quantity of a handful, cure dysentery. The root and stems are hot and dry in the fourth degree; they are a remedy for ringworm and, if taken in a dose of two drachms, calm pains in the stomach and colic; they are diuretic, aid parturition, cure those affections which arise from cold, and allay pains caused by wind."

7. **Clematis grossa** Benth. Pl. Hartw. 33. 1840.

Clematis rhodocarpa Rose, Contr. U. S. Nat. Herb. 10: 95. 1906.

Tamaulipas to Tepic and Chiapas; type from San Bartolo. Central America.

Closely related to *C. dioica*, but apparently distinct, but perhaps not essentially different from *C. sericea* H. B. K., to which specimens have been referred; leaflets usually with numerous large coarse teeth. "Chilillo" (Mexico, Veracruz); "barba de vejo" (Oaxaca, Guatemala); "barba de chivo" (Oaxaca, Veracruz).

Roots said to be used as a remedy for distemper in horses.

8. **Clematis ligusticifolia** Nutt.; Torr. & Gray, Fl. N. Amer. 1: 9. 1838.

Northern Chihuahua and Sonora. Western United States; type from the Rocky Mountains.

Leaflets usually 5 or 7; achenes densely sericeous.

C. neomexicana Woot. & Standl.,[2] described from the San Luis Mountains, on the border between Sonora and New Mexico, is probably not essentially different.

39. BERBERIDACEAE. Barberry Family.

1. ODOSTEMON Raf. Amer. Month. Mag. 192. 1817.

REFERENCE: Fedde, Bot. Jahrb. Engler 31: 30–133. 1901.

Shrubs or small trees with yellow wood; leaves alternate, estipulate, pinnate, the leaflets 3 to many, usually dentate, the teeth often spine-tipped; flowers yellow, perfect, racemose; fruit a berry, with few seeds.

The wood is used in Mexico to give a yellow dye. The roots of *O. aquifolium* (Pursh) Rydb. (*Berberis aquifolium* Pursh), a species native of the western United States, but closely related to some of the Mexican ones, are official in the U. S. Pharmacopoeia. They are bitter and contain the alkaloids berberine, oxyacanthine, and berbamine. Both the fruit and roots have been recommended as possessing alterative, laxative, tonic, and diuretic properties. They are employed in syphilitic and scrofulous affections, chronic cutaneous diseases, convalescence from fevers, etc. This plant is known in the United States as Oregon grape; it is the state flower of Oregon.

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[1] Thesaurus 141. 1651.

[2] Contr. U. S. Nat. Herb. 16: 122. 1913.

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Leaflets 3, the terminal one sessile.
  Leaflets green, merely coriaceous, dentate.....18. O. eutriphyllus.
  Leaflets pale, rigid-coriaceous, deeply lobed.....13. O. trifoliolatus.
Leaflets usually more than 3, if 3 the terminal leaflet petiolulate.
  Flowers paniculate or in elongate long-pedunculate racemes.
    Leaflets entire.
      Inflorescence paniculate.....1. O. ehrenbergii.
      Inflorescence racemose.
        Leaflets acute.....4. O. tenuifolius.
        Leaflets rounded or very obtuse at the apex.
          Pedicels 3 to 5 mm. long; leaflets green.....2. O. chochoco.
          Pedicels 15 to 20 mm. long; leaflets very pale, especially beneath. 3. O. longipes.
    Leaflets dentate.
      Leaflets narrowly lanceolate, mostly 8 to 12 cm. long..5. O. lanceolatus.
      Leaflets ovate or oval, usually much less than 8 cm. long.
        Lateral leaflets 2 pairs.....6. O. quinquefolius.
        Lateral leaflets 3 to 6 pairs.
          Leaflets acute or acutish.
            Teeth of the leaflets small, appressed; leaflets subcoriaceous. 7. O. hartwegii.
            Teeth of the leaflets large, spreading; leaflets coriaceous. 8. O. ilicinus.
          Leaflets rounded or very obtuse at the apex.
            Flowers racemose.....9. O. andrieuxii.
            Flowers paniculate.
              Leaflets subsessile, remote.....10. O. pallidus.
              Leaflets evidently petiolulate, the margins overlapping.
                Leaflets 4 to 5 cm. long, 2 to 3 cm. wide....11. O. zimapanus.
                Leaflets 5 to 11 cm. long, 3 to 9 cm. wide.....12. O. paxii.
  Flowers in short, sessile or short-pedunculate racemes.
    Leaflets very rigid, pale on both surfaces, with large stiff teeth. 14. O. fremontii.
    Leaflets merely coriaceous, deep green on one or both surfaces.
      Leaflets entire or with few appressed teeth.....15. O. gracilis.
      Leaflets with numerous spreading teeth.
        Leaflets 1 to 2 cm. long, 0.7 to 1 cm. wide.....16. O. angustifolius.
        Leaflets 3 to 8 cm. long, 1 to 4 cm. wide.
          Leaflets ovate-lanceolate or lanceolate.....17. O. incertus.
          Leaflets ovate to broadly oval.
            Leaflets usually 5.....19. O. trifolius.
            Leaflets 7 to 11 in all or most of the leaves.
              Leaflets much longer than broad, mostly 1 to 1.5 cm. wide, with numerous small teeth.....20. O. fascicularis.
              Leaflets little longer than broad, 2.5 to 4 cm. wide, with few large teeth.....21. O. wilcoxii.

1. **Odostemon ehrenbergii**[1] (Kunze) Standl.
Berberis ehrenbergii Kunze, Linnaea 20: 45. 1847.
Mahonia ehrenbergii Fedde, Bot. Jahrb. Engler 31: 106. 1901.

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[1] Carl August Ehrenberg (1801–1849) spent 10 years (1831–1840) in Mexico in Oaxaca, Puebla, Mexico, Hidalgo, San Luis Potosí, and other states. He was especially interested in Cactaceae, many species of which he introduced into cultivation in Europe. His collections consisted of about 2,000 numbers.

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Grown from seeds from southern Mexico, probably from Veracruz; not known in the wild state.

Leaflets 7 to 15, ovate, obtuse, entire; flowers whitish, in lax racemes.

2. **Odostemon chochoco** (Schlecht.) Standl. Proc. Biol. Soc. Washington **31**: 133. 1918.

Berberis chochoco Schlecht. Bot. Zeit. **12**: 652. 1854.

Mahonia chochoco Fedde, Bot. Jahrb. Engler **31**: 103. 1901.

Nuevo León, San Luis Potosí, and Veracruz; type from Chococala.

Tree, 6 to 9 meters high; leaflets oval or oblong, 3.5 to 5.5 cm. long, lustrous, with conspicuous venation; fruit blue. "Chochoco," "palo amarillo."

Wood used for tanning and dyeing.

3. **Odostemon longipes** Standl. Proc. Biol. Soc. Washington **31**: 133. 1918.

Known only from the type locality, San Ramón, Durango.

Tree, 7.5 to 9 meters high, with a trunk 60 cm. or less in diameter, and a large crown; leaflets 11 or 13, oblong, 3.5 to 5.5 cm. long; fruit blue, edible. "Palo amarillo."

4. **Odostemon tenuifolius** (Lindl.) Standl.

Berberis tenuifolia Lindl. Bot. Reg. Misc. 24. 1838.

Mahonia tenuifolia Loud.; Steud. Nom. Bot. ed. 2. **1**: 197. 1840.

Berberis fraxinifolia Hook. Icon. Pl. *pl. 329, 330.* 1841.

Veracruz; type from Zacuapan.

Shrub, 3 meters high; leaflets oblong-lanceolate, 4.5 to 10 cm. long, bright green; flowers in very long racemes.

5. **Odostemon lanceolatus** (Benth.) Standl.

Berberis lanceolata Benth. Pl. Hartw. 34. 1840.

Mahonia lanceolata Fedde, Bot. Jahrb. Engler **31**: 92. 1901.

Hidalgo; type from Apulco; perhaps also in Oaxaca.

Shrub, 1 to 2 meters high; leaflets 11 to 17, spine-toothed; fruit blue.

6. **Odostemon quinquefolius** Standl. Proc. Biol. Soc. Washington **31**: 133. 1918.

Puebla; type from Cerro Matzize, near San Luis Tultitlanapa.

Large glabrous shrub; leaflets 5, oblong-ovate or ovate-oval, 3 to 5.3 cm. long; racemes 7 to 11 cm. long.

7. **Odostemon hartwegii** (Benth.) Standl.

Berberis hartwegii Benth. Pl. Hartw. 34. 1840.

Mahonia hartwegii Fedde, Bot. Jahrb. Engler **31**: 109. 1901.

Known only from the type locality, Contadero, Hidalgo.

Leaflets 11 to 15, ovate-lanceolate, acuminate; racemes 30 cm. long.

8. **Odostemon ilicinus** (Schlecht.) Standl.

Mahonia ilicina Schlecht. Linnaea **10**: 236. 1835.

Berberis ilicina Hemsl. Biol. Centr. Amer. Bot. **1**: 23. 1879.

Veracruz and Hidalgo; type from plains between Guantololalpa and Tlachichilco, Veracruz.

Shrub, 0.5 to 3 meters high; leaflets 11 to 15.

9. **Odostemon andrieuxii**[1] (Hook. & Arn.) Standl.

Berberis andrieuxii Hook. & Arn. Bot. Beechey Voy. 318. 1841.

Mahonia andrieuxii Fedde, Bot. Jahrb. Engler **31**: 103. 1901.

Known only from the original collection, from somewhere in southern Mexico.

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[1] G. Andrieux, concerning whom no accurate data are available, collected in the states of Oaxaca, Puebla, and Mexico about 1834. His collections were distributed to various European herbaria.

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10. Odostemon pallidus (Hartw.) Standl.

Berberis pallida Hartw.; Benth. Pl. Hartw. 34. 1840.

Mahonia pallida Fedde, Bot. Jahrb. Engler **31**: 109. 1901.

Hidalgo to Oaxaca; type from Cardonal, Hidalgo.

Shrub or small tree, 2 to 6 meters high; leaflets 9 to 13, oval, 3 to 6.5 cm. long, rounded or obtuse at the apex, pale beneath; panicles 15 to 25 cm. long. "Palo amarillo."

11. Odostemon zimapanus (Fedde) Standl.

Mahonia zimapana Fedde, Bot. Jahrb. Engler **31**: 111. 1901.

Hidalgo and Mexico; type from Las Verdosas, near Zimapán, Hidalgo.

12. Odostemon paxii (Fedde) Standl.

Mahonia paxii Fedde, Bot. Jahrb. Engler **31**: 113. 1901.

Known only from the type locality, between Zimapán and Encarnación, Hidalgo.

13. Odostemon trifoliolatus (Moric.) Heller, Muhlenbergia **7**: 139. 1912.

Berberis trifoliolata Moric. Pl. Amer. Rar. 113. *pl. 69.* 1841.

Berberis ilicifolia Scheele, Linnaea **21**: 591. 1848.

Mahonia trifoliolata Fedde, Bot. Jahrb. Engler **31**: 96. 1901.

Chihuahua and Coahuila to San Luis Potosí. Western Texas (type locality) and southern New Mexico.

Shrub, 1 to 4.5 meters high; leaflets mostly 3 to 5 cm. long, very thick and rigid, pale, especially beneath, with large spiny lobes or teeth; fruit red. "Agritos" (Coahuila, Nuevo León, Texas); "agrillo" (San Luis Potosí, *Safford*); "palo amarillo" (Chihuahua, Nuevo León, Durango).

In Texas and New Mexico the name "agrito" is corrupted into "agarita" or even "algerita."

The wood is sometimes used for tanning and for making ink. Like that of other species, it yields a yellow dye. The acid fruit is utilized for jelly, preserves, and tarts, and wine has been made from it. The roasted seeds are said to have been used as a coffee substitute. A decoction of the root is reported to be employed in Texas as a remedy for toothache. The flowers are said to supply bees with a good quality of honey.

This is presumably the species to which Berlandier[1] gives the name *Chrysodendron tinctoria*, a new genus which, however, is not technically described. He states that the plant is known in Tamaulipas as "palo amarillo," and is used by the Indians to dye deerskins and cotton goods.

14. Odostemon fremontii (Torr.) Rydb. Bull. Torrey Club **33**: 141. 1906.

Berberis fremontii Torr. U. S. & Mex. Bound. Bot. 30. 1859.

Mahonia fremontii Fedde, Bot. Jahrb. Engler **31**: 98. 1901.

Sonora and Baja California. New Mexico to southern Utah (type locality) and California.

Shrub, 2 to 4 meters high, often forming dense rounded clumps; leaflets usually 5, about 2 cm. long, very spiny; fruit reddish, nearly dry.

A specimen collected by Pringle in Sonora is referred by Fedde to *O. haematocarpus* (Wooton) Heller.[2] This and *O. fremontii* are not very sharply differentiated. It seems better to the present writer to refer all the Mexican

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[1] In Diario de viage de la Comisión de Límites que puso el Gobierno de la República bajo la dirección del Exmo. Sr. general de división D. Manuel de Mier y Teran. Mexico, 1850. The name appears on p. 170.

[2] Muhlenbergia **7**: 129. 1912. *Berberis haematocarpa* Wooton, Bull. Torrey Club **25**: 304. 1898; type from New Mexico.

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material to the latter species. One of the Baja California specimens seems to be intermediate between the two species.

15. Odostemon gracilis (Hartw.) Standl.

Berberis gracilis Hartw.; Benth. Pl. Hartw. 34. 1840.

Mahonia subintegrifolia Fedde, Bot. Jahrb. Engler 31: 94. 1901.

Mahonia gracilis Fedde, Bot. Jahrb. Engler 31: 95. 1901.

Nuevo León to Oaxaca; type from Zimapán, Hidalgo.

Shrub, 1 to 1.5 meters high; leaflets 5 or 7, ovate, 3 to 5 cm. long, acute; fruit blue. "Palo amarillo" (Mexico).

16. Odostemon angustifolius (Hartw.) Standl.

Berberis angustifolia Hartw.; Benth. Pl. Hartw. 34. 1840.

Mahonia angustifolia Fedde, Bot. Jahrb. Engler 31: 91. 1901.

Known only from the type locality, between Actopan and Pachuca, Hidalgo.

Shrub, about 4 meters high; leaflets 5 to 9, oblong-lanceolate; fruit purple, sweet.

17. Odostemon incertus (Fedde) Standl.

Mahonia incerta Fedde, Bot. Jahrb. Engler 31: 93. 1901.

Known only from the type locality, between Real del Monte and Atotonilco El Chico, Hidalgo.

18. Odostemon eutriphyllus (Fedde) Standl.

Mahonia eutriphylla Fedde, Bot. Jahrb. Engler 31: 91. 1901.

Coahuila to Mexico; type from La Encarnación.

Low shrub; leaflets oval or broader, 2 to 3 cm. long, very spiny.

A specimen from Ixtaccihuatl was collected on rocks above timber line at an altitude of 3,900 meters. It is possible that the material referred here represents more than a single species. Palmer's no. 14, from Coahuila, is referred to *O. schiedeanus* by Fedde, but the specimen of this collection in the National Herbarium is certainly not that species. Probably two different plants were distributed under the same number.

19. Odostemon trifolius (Cham. & Schlecht.) Standl.

Berberis trifolia Cham. & Schlecht. Linnaea 5: 211. 1830.

Mahonia trifolia Roem. & Schult. Syst. Veg. 7: 1616. 1830.

Berberis schiedeana Schlecht. Bot. Zeit. 12: 654. 1854.

Mahonia schiedeana Fedde, Bot. Jahrb. Engler 31: 90. 1901.

Hidalgo and Mexico; type from the plains between Guantotalapa and Tlachichilco (Veracruz ?).

Low shrub, sometimes prostrate; ascending in the Sierra de las Cruces to 3,600 meters; leaflets oval, 2 to 3 cm. long, very spiny; fruit blue.

20. Odostemon fascicularis (DC.) Abrams, Bull. N. Y. Bot. Gard. 6: 360. 1910.

Berberis pinnata Lag. Elench. Hort. Madr. 6. 1803, nomen nudum.

Mahonia fascicularis DC. Reg. Veg. Syst. 2: 19. 1821.

Berberis moranensis Roem. & Schult. Syst. Veg. 7: 17. 1829.

Mahonia pinnata Fedde, Bot. Jahrb. Engler 31: 86. 1901.

Mahonia pinnata cachira Fedde, Bot. Jahrb. Engler 31: 88. 1901.

Veracruz to Guanajuato, Michoacán, and Oaxaca. Guatemala; California, the type from Monterey.

Shrub, 1 to 3.5 meters high; leaflets with small spiny teeth. The following names are reported, but probably at least some of them apply to other species: "Retamilla," "xoxoco" (Mexico); "palo jarilla" (Valley of Mexico); "cachisdá" (Hidalgo, Mexico, Guanajuato); "camisdá" (Hidalgo, Veracruz); "quisquirindin," "quisquiringuin" (Hidalgo, Distrito Federal); "palo amarillo"; "leña amarilla"; "palo de teñir;" "yagabuxe" (Oaxaca).

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The fruit is rather sweet and edible; it and the bark are used in domestic medicine.

21. Odostemon wilcoxii (Kearney) Heller, Muhlenbergia **7**: 139. 1912.

Berberis wilcoxii Kearney, Trans. N. Y. Acad. **14**: 29. 1894.

Northern Sonora. Southern Arizona and New Mexico; type from Fort Huachuca, Arizona.

Low shrub; leaflets 3 to 5 cm. long, lustrous; fruit blue.

This is referred by Fedde to *O. dictyotus* (Jepson) Abrams,[1] and may not be specifically distant from that California plant.

40. MENISPERMACEAE. Moonseed Family.

Shrubs, usually scandent; leaves alternate, estipulate, petiolate, entire or lobate; flowers small, dioecious, cymose, the cymes racemose or paniculate; petals and sepals usually 6 each; stamens as many as the petals and opposite them.

Endosperm none; leaves thick-coriaceous, glabrous.....1. **HYPERBAENA.**
Endosperm present; leaves never thick-coriaceous.
  Carpel 1; bracts of the inflorescence large, leaflike; stamens connate. Leaves usually peltate.....2. **CISSAMPELOS.**
  Carpels usually 3; bracts of the inflorescence small; stamens free.
    Leaves not peltate; sepals and petals subequal.....3. **CEBATHA.**
    Leaves peltate; sepals and petals unequal.....4. **MENISPERMUM.**

1. HYPERBAENA Miers, Ann. Sci. Nat. II. 7: 44. 1851.

REFERENCE: Diels in Engl. Pflanzenreich IV. **94**: 198–203. 1910.

1. Hyperbaena mexicana Miers, Ann. Sci. Nat. III. **19**: 94. 1867.

Known only from the original collection from somewhere in Mexico.

Scandent shrub, nearly glabrous; leaves oblanceolate-oblong, 10 to 12 cm. long, acuminate, entire.

2. CISSAMPELOS L. Sp. Pl. 1031. 1753.

REFERENCE: Diels in Engl. Pflanzenreich IV. **94**: 283–306. 1910.

1. Cissampelos pareira L. Sp. Pl. 1031. 1753.

Cissampelos caapeba L. Sp. Pl. 1032. 1753.

Cissampelos tomentosa DC. Reg. Veg. Syst. **1**: 535. 1818.

Cissampelos acuminata Benth. Pl. Hartw. 445. 1840. Not *C. acuminata* DC. 1818.

Cissampelos benthamiana Miers, Ann. Nat. Hist. III. **17**: 144. 1866.

Tamaulipas to Sonora, Chiapas, and Yucatán. Distributed almost throughout the tropics of the world.

Scandent shrub, usually densely pubescent, the hairs somewhat stinging; leaves orbicular, reniform, or cordate; bracts of the pistillate inflorescence similar to the leaves but smaller; flowers very small, greenish white; fruit a red or orange drupe. "Oreja de ratón" (Michoacán, Guerrero); "butua" (Colima, Guerrero, Veracruz); "pareira brava" (Veracruz, Oaxaca); "iztaccoanenepilli" (*Nueva Farmacopea Mexicana*); "bejuco azul," "venadero" (Costa Rica); "picamano" (Nicaragua); "bejuco de mono" (Porto Rico); "alcotán" (Guatemala, El Salvador); "bejuco de alcotán" (El Salvador);

[1] Bull. N. Y. Bot. Gard. **6**: 360. 1910. *Berberis dictyota* Jepson, Bull. Torrey Club **18**: 319. 1891.

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"cotán" (Guatemala); "hierba ratón" (Venezuela); "tomatillo de sabana" (Cuba).

The roots are hard, tortuous, brown, and rugose, with a bitter flavor. They are said to have diuretic, emmenagogue, febrifuge, and expectorant properties, and are used in treating urinary and venereal diseases. The plant also has a great reputation throughout tropical America as a remedy for the bites of venomous snakes. It has been confused with the "pareira brava" of commerce, which is furnished by a South American plant (*Chondodendron tomentosum* Ruiz & Pavón) of the same family, and is used sometimes as an adulterant of that drug. The leaves are said to be employed as a poultice for treating wounds. The name "velvet-leaf" is applied to the plant in Jamaica. The leaves have been suspected to be poisonous to cattle.

3. CEBATHA Forsk. Fl. Aegypt. Arab. 172. 1775.

REFERENCE: Diels in Engl. Pflanzenreich IV. 94: 227–241. 1910.

Slender scandent shrubs; leaves thin, entire or shallowly lobate; petals 6; stamens 6 to 9; fruit a drupe.

Leaves densely pilose beneath, those of the flowering branches broadly ovate or ovate-deltoid ..... 1. C. carolina.

Leaves glabrous or glabrate beneath, those of the flowering branches usually lance-linear to elliptic-oblong ..... 2. C. diversifolia.

1. **Cebatha carolina** (L.) Britton, Mem. Torrey Club 5: 162. 1894.

Menispermum carolinum L. Sp. Pl. 340. 1753.

Cocculus carolinus DC. Reg. Veg. Syst. 1: 524. 1818.

Tamaulipas. Eastern United States; type from Carolina.

Plants copiously pubescent; leaves 3.5 to 6.5 cm. wide, obtuse or rounded at apex, pale beneath; flowers cream-colored; fruit red, edible. "Hierba del ojo" (Tamaulipas).

2. **Cebatha diversifolia** (DC.) Kuntze, Rev. Gen. Pl. 1: 9. 1891.

Cocculus diversifolius DC. Reg. Veg. Syst. 1: 523. 1818.

Cocculus oblongifolius DC. Reg. Veg. Syst. 1: 529. 1818.

Tamaulipas to Sonora and Oaxaca; described from one of Mociño and Sessé's drawings. Western Texas and southern Arizona.

Climbing over shrubs and fences; leaves extremely variable, ranging from linear to broadly ovate, entire or lobate; fruit dark purple.

4. MENISPERMUM L. Sp. Pl. 340. 1753.

1. **Menispermum canadense** L. Sp. Pl. 340. 1753.

Menispermum mexicanum Rose, Contr. U. S. Nat. Herb. 13: 302. 1911.

Mountains of Nuevo León. Eastern and southern United States.

Slender pubescent vine; leaves long-petiolate, the blades nearly orbicular, 5 to 20 cm. wide, angulate or shallowly lobed, sometimes entire, pale beneath; stamens 10 to 20; fruit dark blue, about 1 cm. wide.

The roots of moonseed have been used in the United States in domestic medicine as a tonic and for venereal diseases. They contain an alkaloid, menispine, and were formerly official as a substitute for sarsaparilla.

41. MAGNOLIACEAE. Magnolia Family.

Trees or shrubs; leaves alternate, stipulate or estipulate, entire; flowers perfect, often large and showy, solitary or fasciculate; sepals 2 to 6; petals 6 to many; stamens numerous; fruit of few or numerous carpels.

Stipules large, deciduous; flowers large, 5 to 10 cm. long; carpels of the fruit imbricate in numerous series.

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Carpels bivalvate at maturity; petals comparatively thin---1. **MAGNOLIA.**
Carpels indehiscent; petals thick and leathery----------2. **TALAUMA.**
Stipules none; flowers less than 3 cm. long; carpels verticillate in a single series.
Leaves glaucous beneath; carpels indehiscent; sepals valvate--3. **DRIMYS.**
Leaves green beneath; carpels dehiscent; sepals imbricate----4. **ILLICIUM.**

1. MAGNOLIA L. Sp. Pl. 535. 1753.

Large trees; leaves petiolate, persistent or deciduous; flowers large, white, solitary; sepals 3; petals 6 to 12; fruit conelike.

Most of the species of magnolias have very showy flowers, and many are in cultivation. *Magnolia grandiflora* L., the bull bay of the southeastern United States, with handsome evergreen leaves, is said to be cultivated in Mexico and to be known as "magnolia" and "Semíramis."

Leaves persistent, the blades rounded to acute at base, green beneath. **1. M. schiedeana.**
Leaves deciduous, the blades cordate at base, white beneath----**2 M. dealbata.**

1. Magnolia schiedeana Schlecht. Bot. Zeit. **1864**: 144. 1864.

Veracruz to Tepic and Sinaloa.

Large tree; leaves oval or elliptic, 12 to 17 cm. long, acute, glabrous, with very prominent, finely reticulate venation; flowers creamy white, the petals about 6 cm. long. "Corpus" (Tepic, *Rose*).

Rose reports that a decoction of the flowers is used in Tepic as a remedy for scorpion stings.

2. Magnolia dealbata Zucc. Abh. Bayer. Akad. **2**: 373. *pl. 3, 4*. 1836.

Veracruz and Oaxaca; type collected in forests near Rincón, at an altitude of 600 to 900 meters.

Tree, 4.5 to 5.5 meters high (according to Zuccarini); leaves obovate-oval, 30 to 50 cm. long or larger, green on the upper surface, white beneath, obtuse or acutish at apex; flowers yellowish white, fragrant, 30 to 40 cm. broad; seeds covered with a fleshy orange aril. "Elosúchil" (Oaxaca; from the Nahuatl, *elotl*, a green ear of corn with husk, and *xochitl*, flower).

A relative of *M. macrophylla* Michx., of the southeastern United States, and perhaps not distinct from it. Reported from Mexico by Sessé and Mociño[1] as *M. tripetala*, a species confined to the southeastern United States.

2. TALAUMA Juss. Gen. Pl. 281. 1789.

1. Talauma mexicana (DC.) Don, Hist. Dichl. Pl. **1**: 851. 1831.

Magnolia mexicana DC. Reg. Veg. Syst. **1**: 451. 1818.

Talauma macrocarpa Zucc. Abh. Bayer. Akad. **2**: 369. *pl. 1, 2*. 1836.

Mountains of Veracruz, Oaxaca, Mexico, and Morelos.

A large tree, sometimes 30 meters high, with a trunk 1.2 to 1.5 meters in diameter; leaves persistent, oval or elliptic, 12 to 25 cm. long or larger, acute, lustrous, reticulate-veined; flowers large, white, sweet-scented, the petals and sepals very thick and leathery, often tinged with purple; sepals 3; seeds surrounded by a fleshy red aril, hanging by a white threadlike funicle. "Flor de corazón" (Oaxaca, Veracruz, Morelos); "hualhua" (Veracruz, Morelos); "yoloxochitl" (Nahuatl); "hierba de las mataduras" (Morelos, Mexico, *Ramírez*); "laurel tulipán" (Morelos); "guielachi" (Oaxaca, Zapotec, *Reko*).

This is one of the best-known of Mexican trees. It was highly esteemed by the early inhabitants because of the sweet odor of the blossoms, a single flower being sufficient to perfume a whole house. The tree was cultivated in gardens, and the flowers were reserved for the exclusive use of the nobility. The plant

[1] Fl. Mex. 145. 1894.

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was valued also for its reputed medicinal properties, and it still finds use in domestic medicine. The bark is employed for fevers, and is said also to have an effect upon the heart similar to that of digitalis. A decoction of the flowers is administered for epilepsy, paralysis, and various heart affections, and as a tonic. The plant, upon analysis, is said to yield a glucoside which dissolves the blood corpuscles.[1]

The Nahuatl name, "yoloxochitl," signifies "heart-flower," an allusion to the shape of the unopened flower buds. Robelo gives "chipagua" as one of the vernacular names—a derivative of the Nahuatl *chipahuac*, "the beautiful." The species has been reported from Mexico[2] as *Magnolia glauca*, a name synonymous with *M. virginiana* L., which pertains to the sweet bay of the eastern and southern United States. It appears, also, that *Talauma mexicana* and *Magnolia schiedeana* have often been confused. The two species are much alike in leaf form and in the appearance of their flowers, but the fruits are very different.

Talauma macrocarpa is mentioned by Acosta (1590) under the name "yolosuchil." It is illustrated and described by Hernández[3] under the name "yoloxochitl." The latter author discusses its medical properties, stating that "it is an excellent remedy for sterility," and remarks that the flowers were sometimes used to flavor chocolate.

3. DRIMYS Forst. Char. Gen. 83. 1776.

1. **Drimys winteri** Forst. Char. Gen. 84. *pl. 42.* 1776.

Drimys granatensis L. f. Suppl. Pl. 269. 1781.

Drimys mexicana Moc. & Sessé; DC. Reg. Veg. Syst. 1: 444. 1818.

Veracruz and Oaxaca; reported from other states; sometimes cultivated. Central America and southward to the Straits of Magellan.

An evergreen shrub or tree, in some parts of its range 18 meters high, with grayish bark; leaves mostly oblong or oblong-obovate, 7 to 13 cm. long, coriaceous, persistent, green above, glaucous beneath, petiolate; flowers solitary or umbellate, white; sepals 2 or 3; petals 6 or more; fruit purplish black. "Chilillo," "chachaca," "palo picante" (various parts of Mexico); "palo de chile" (Oaxaca); "muelo," "quiebra-muelas" (Costa Rica); "canelo" (Chile).

This plant, which furnishes the Winter's bark of commerce, was first obtained by Winter, who was captain of one of the ships which accompanied Sir Francis Drake's expedition of 1577. The three vessels of the fleet were struck by a storm in the southern ocean and Winter's ship was driven to the Straits of Magellan, where three weeks were spent with the object of improving the health of the crew. *Drimys* was one of the plants which attracted Winter's attention, and he used the bark for treating scurvy. Specimens of the bark were presented to the famous botanist Clusius, who gave it the name of Cortex Winteranus. It became a favorite remedy in Europe, but as it was difficult to obtain the drug from South America the bark of *Canella alba*, a West Indian tree, was often substituted for it. Winter's bark is little used at the present time except in domestic medicine in the regions where it is native. It is aromatic and pungent and has tonic and antiscorbutic properties. In Brazil it is used for dysentery and for gastric disturbances. In Costa Rica the bark is chewed for toothache. The powdered bark is sometimes employed in Mexico as a condiment.

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[1] For accounts of the plant see A. L. Herrera, El yoloxochitl, Estudio 4: 133; E. Armendáriz, Analysis de las semillas del yoloxochitl, Estudio 4: 248.

[2] Sessé & Moc. Pl. Nov. Hisp. 90. 1887.

[3] Thesaurus 40. 1651.

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It may be that the species as accepted here should be divided into two or more, but the general practice of recent writers has been to refer all the American forms to a single species.

4. **ILLICIUM** L. Syst. Nat. ed. 10. 1050. 1759.

1. **Illicium floridanum** Ellis, Phil. Trans. London 60: 524. *pl. 12.* 1770.

Veracruz and Puebla. Florida to Louisiana.

Aromatic evergreen shrub, 1.5 to 3 meters high; leaves elliptic or lance-elliptic, 7 to 14 cm. long, acuminate, petiolate, persistent, gland-dotted beneath; flowers long-pedicellate, with 20 to 30 narrow, dark crimson or purple petals. "Matacaballos" (Veracruz); "ixcapantl" (Puebla).

The shrub is reputed poisonous to stock. It is known in Florida as "poison bay" and "sweet laurel." The Mexican form has been illustrated recently (Bol. Dir. Estud. Biol. 1: 661. 1916).

A related species of China, *Illicium verum* Hook. f., is the star-anise, whose fruit is much used in oriental countries for flavoring food.

42. ANNONACEAE. Custard-apple Family.

Trees or shrubs, often aromatic; leaves alternate, estipulate, entire; flowers solitary or clustered, usually perfect, commonly with 3 sepals and 6 fleshy or leathery petals; stamens numerous; fruit of 1 or more carpels, these sessile or stipitate, usually fleshy, free or united to form a many-celled fruit.

Petals, at least the outer ones, imbricate.
- Seeds solitary, attached at the base of the cell; flowers small. — 1. **GUATTERIA.**
- Seeds several, attached to the side of the cell; flowers usually very large. — 2. **SAPRANTHUS.**

Petals valvate.
- Outer petals separated, not connivent.
  - Carpel of the fruit one — 3. **TRIDIMERIS.**
  - Carpels numerous.
    - Inner petals clawed — 4. **CYMBOPETALUM.**
    - Inner petals not clawed — 5. **DESMOPSIS.**
- Outer petals connivent.
  - Ovules 2 to many in each carpel; carpels distinct in fruit — 6. **XYLOPIA.**
  - Ovules one in each carpel; carpels concrete in fruit.
    - Petals connate into a 3 or 6-lobed tube, the outer ones wing-appendaged. — 7. **ROLLINIA.**
    - Petals not connate, the outer ones not appendaged — 8. **ANNONA.**

1. **GUATTERIA** Ruiz & Pav. Fl. Peruv. Chil. Prodr. 85. 1794.

Trees or shrubs; peduncles 1-flowered, axillary, solitary or fasciculate, pubescent; fruit composed of numerous stipitate berries.

Petals about 6 mm. long — 1. **G. bibracteata.**

Petals 1 cm. long or often much larger.
- Leaves cordate at base — 2. **G. macrantha.**
- Leaves rounded to acute at base.
  - Leaves short-acuminate at apex.
    - Petals 2 to 4.3 cm. long; leaves 5 to 15 cm. long.
      - Leaves 2 to 2.5 cm. long — 3. **G. gaumeri.**
      - Leaves 3 to 5 cm. wide — 7. **G. depressa.**
    - Petals 1 to 1.5 cm. long; leaves mostly 15 to 25 cm. long. — 4. **G. diospyroides.**

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Leaves long-acuminate at apex.
Flowers geminate ..... **5. G. galeottiana.**
Flowers solitary ..... **6. G. jurgensenii.**

1. **Guatteria bibracteata** (Hook.) Hemsl. Diag. Pl. Mex. 1. 1878.
Annona bibracteata Hook. Icon. Pl. 4: *pl. 328.* 1841.
Veracruz; type from Consoquintla.
Tree; leaves oblong-lanceolate, short-petiolate, sparsely pubescent or glabrous; flowers green.

2. **Guatteria macrantha** Presl, Rel. Haenk. 2:.78. 1835.
Described from somewhere in Mexico.
Perhaps not of this genus.

3. **Guatteria gaumeri** Greenm. Field Mus. Bot. 2: 251. 1907.
Vicinity of Izamal, Yucatán.
Tree, 10 to 15 meters high, with gray bark; leaves elliptic or elliptic-oval, with an aromatic odor when crushed. "Elemuy."
Used medicinally.

4. **Guatteria diospyroides** Baill. Adansonia 8: 269. 1868.
Oaxaca; type from Trapiche de la Concepción.
Leaves lance-elliptic, 10 to 25 cm. long, short-petioled, glabrous or nearly so; flowers green.

5. **Guatteria galeottiana** Baill. Adansonia 8: 268. 1868.
Oaxaca (type locality) and Campeche.
Leaves lanceolate, 10 to 25 cm. long.

6. **Guatteria jurgensenii** Hemsl. Diag. Pl. Mex. 1. 1878.
Oaxaca; type from Sierra San Pedro Nolasco.
Leaves lanceolate, 15 to 23 cm. long: flowers (as in the other species) sericeous, about 2.5 cm. broad.

7. **Guatteria depressa** (Baill.) Safford.
Annona depressa Baill. Adansonia 8: 267. 1868.
Veracruz and perhaps elsewhere; type from Tozamapa.
Similar to *G. gaumeri*, but with broader leaves, these very thick and lustrous; carpels of the fruit numerous, ellipsoid, long-stipitate.

2. SAPRANTHUS Seem. Journ. Bot. 4: 369. 1866.

Shrubs or trees; flowers very large, solitary, with an extremely disagreeable odor of carrion; fruit of few large sessile carpels.

Petals mostly 6 to 8 cm. long ..... **1. S. foetidus.**
Petals 4 cm. long or shorter.
Leaf blades oblong-elliptic, acuminate; petals about 4 cm. long **2. S. campechianus.**
Leaf blades oblong-obovate, obtuse or acutish; petals about 2 cm. long. **3. S. microcarpus.**

1. **Sapranthus foetidus** (Rose) Safford.
Asimina foetida Rose, Contr. U. S. Nat. Herb. 5: 134. 1897.
Sinaloa to Oaxaca; type from Acapulco.
Shrub or small tree, 4 to 5 meters high, copiously pubescent; leaves oval to oblong, 7 to 14 cm. long or larger, short-petiolate, acute or obtuse; petals greenish yellow at first, maroon or dark purple at maturity, with conspicuous veins. "Madre de cacao" (Oaxaca); "murciélago" (Guerrero); "zopilotillo" (Sinaloa).

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2. Sapranthus campechianus (H. B. K.) Standl.

Asimia campechiana H. B. K. Nov. Gen. & Sp. 5: 61. 1821.

Asimina insularis Hemsl. in Hook. Icon. Pl. 16: *pl. 1514*. 1886.

Campeche (type locality) and Yucatán.

Tree, 6 meters high; leaves elliptic-oblong, 6.5 to 8.5 cm. long, acuminate, pubescent.

Asimina insularis is perhaps distinct but, judging from the description, the species are very closely related.

3. Sapranthus microcarpus (Donn. Smith) Fries, Svensk. Vet. Akad. Handl. 34[5]: 12. 1900.

Porcelia microcarpa Donn. Smith, Bot. Gaz. 20: 1. 1895.

Asimina purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 375. 1913.

Veracruz and Oaxaca. Guatemala; type from Ocosito.

Shrub, 1.8 to 2.7 meters high; leaves obovate or oval-oblong, mostly 5 to 8 cm. long, obtuse or acute; carpels 2.5 to 4.5 cm. long.

DOUBTFUL SPECIES.

UNONA VIOLACEA Dunal, Monogr. Anon. 105. *pl. 25*. 1817. This plant, described from Mexico, is probably the same as one of the species listed above, perhaps *S. foetidus*.

3. TRIDIMERIS Baill. Adansonia 9: 219. 1869.

1. Tridimeris hahniana[1] Baill. Adansonia 9: 219. 1869.

Type from the forests of San Cristóbal (Oaxaca?).

A small tree.

4. CYMBOPETALUM Benth. Journ. Linn. Soc. Bot. 5: 69. 1861.

1. Cymbopetalum penduliflorum (Dunal) Baill. Adansonia 8: 268. 1868.

Unona penduliflora Dunal, Monogr. Anon. 100. *pl. 28*. 1817.

Veracruz and Oaxaca. Guatemala.

Tree or large shrub with long narrow leaves; petals purplish within, greenish outside. "Guineillo," "guineillo prieto" (Oaxaca); "xochinacaztli" (Nahuatl).

The aromatic petals were used in preconquest days for flavoring chocolate and are still so used in some localities. The flowers were used also as a remedy for asthma and other diseases.[2] This plant was highly esteemed by the early inhabitants of Mexico, having been brought from the south to be grown in the gardens of the emperor. It is first mentioned by Sahagún (1509), under the name "teunacaztli," "the sacred ear." He states that the flowers were valued for their odor and for flavoring chocolate. Hernández describes and figures[3] the plant in a chapter entitled "De *Xochinacaztli*, seu flore auriculae." The Nahuatl term *xochinacaztli* signifies "ear-flower." Hernández states that the plant is a native of the *tierra caliente*, and that in the *tiangues* or markets of the Indians there is nothing more frequently found or more highly prized than this flower, "which is wont to give the greatest charm and taste, together with a very fragrant

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[1] Ludwig Hahn spent nearly 20 years in Mexico as a teacher of music, and made extensive collections of plants and animals, most of which were sent to Berlin. He was a member of the French Scientific Commission, and an associate of Bourgeau. He died in Mexico in 1873. Some of his plants are in the U. S. National Herbarum.

[2] See W. E. Safford, Science, n. ser. 33: 470. 1911; Smiths. Rept. 1910: 428. 1911; Journ. Washington Acad. Sci. 2: 234. 1912.

[3] Thesaurus 30. 1651.

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odor and flavor to that celebrated drink cacao, which they call chocolate, and it imparts to it certain tonic properties and wholesomeness as well. It is said that when drunk in water this flower dispels flatulency, causes phlegm to become thin, warms and comforts the stomach which has been chilled or weakened, as well as the heart; and that it is efficacious in asthma, ground to a powder with addition of two pods of the red peppers called *texochilli*, with their seeds removed and toasted on a *comal*, which is a kind of griddle on which the natives toast and make their bread called by us *tortillas*, adding to the same three drops of balsam and taking it in some suitable liquor." It is of interest to note that the dried flowers are still offered for sale in the markets of Guatemala.

5. DESMOPSIS Safford, Bull. Torrey Club 43: 184. 1916.

1. **Desmopsis galeottiana** (Baill.) Safford, Bull. Torrey Club 43: 187. 1916.
   Trigyneia galeottiana Baill. Adansonia 8: 181. 1868.
   Veracruz; type from Palanque.
   Shrub or small tree with elliptic-lanceolate leaves; flowers green, on long slender pedicels; fruit of 7 to 11 carpels.

6. XYLOPIA L. Syst. Nat. ed. 10. 1250. 1750.

1. **Xylopia trunciflora** Schlecht. & Cham. Linnaea 6: 417. 1831.
   Known only from the type locality, near Colipa, Veracruz.
   Small tree; leaves lance-elliptic, 10 cm. long, obtuse, subsessile, pubescent beneath; flowers borne along the trunk; carpels 5 to 7, globose or ellipsoid, 1 to 3-seeded.

7. ROLLINIA St. Hil. Fl. Bras. Merid. 1: 28. 1825.

1. **Rollinia mucosa** (Jacq.) Baill. Adansonia 8: 268. 1868.
   Annona mucosa Jacq. Obs. Bot. 16. 1764.
   Veracruz. Trinidad and Lesser Antilles; type locality, Martinique.
   Tree with brownish branches; leaves oblong or elliptic, 7 to 14 cm. long, acuminate; flowers solitary, long-pedunculate. "Anona" (*Ramirez*); "anón," "candongo" (Santo Domingo).

8. ANNONA L. Sp. Pl. 536. 1753.

References: Safford, Classification of the genus *Annona*, with descriptions of new and imperfectly known species, Contr. U. S. Nat. Herb. 16: 1–68. *pl. 1–41, f. 1–75.* 1914; Safford, *Annona sericea* and its allies, Contr. U. S. Nat. Herb. 16: 263–275. *pl. 85–99, f. 42–44.* 1913; Safford, The genus *Annona:* The derivation of its name and its taxonomic subdivisions, Journ. Washington Acad. Sci. 1: 118. 1911; Safford, *Annona*, in Bailey, Stand. Cycl. Hort. 291–295. 1914.

Trees or shrubs; leaves deciduous or persistent; flowers usually solitary, lateral; fruit very variable, composed of numerous carpels crowded together into a fleshy mass.

The generic name (sometimes, but incorrectly, written *Anona*) is a modification of the Haitian name of some of the species, "anón." Belmar gives the Mixe equivalents of "anona" as "ai-dium," "ait-keip" (the tree), and "tzaptzaidium."

Flowers subglobose or broadly pyramidal in bud.
- Petals 3 or, if 6, the inner ones rudimentary or much narrower than the outer ones.
  - Leaf blades 4 to 9 cm. long, thinly appressed-pilose beneath; flowers short-pedicellate ..... 1. **A. globiflora.**
  - Leaf blades 9 to 14 cm. long, densely soft-pilose beneath; flowers long-pedicellate ..... 2. **A. longipes.**

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Petals 6, broad, in 2 series.
Inner petals valvate.....3. A. glabra.
Inner petals imbricate.
Leaves with minute pockets beneath in the axils of the lateral nerves. 4. A. muricata.
Leaves without pockets in the axils of the nerves.....5. A. purpurea.
Flowers elongate and more or less triquetrous in bud.
Peduncles with clasping leaflike bracts at base; testa of seeds thick and hard. 6. A. diversifolia.
Peduncles without clasping leaflike bracts at base; testa thin.
Outer petals about 8 mm. long. Fruit 2 to 2.5 cm. in diameter; leaves lanceolate.....7. A. palmeri.
Outer petals 1.8 to 5 cm. long.
Leaves rounded or obtuse at apex, oval or rounded, soft-pilose or tomentose beneath.
Outer petals 1.8 to 2.5 cm. long.....8. A. cherimola.
Outer petals 4 to 5 cm. long.....9. A. longiflora.
Leaves acute or acuminate at apex, oblong-lanceolate to elliptic-oval, nearly glabrous beneath, at least in age. Flowers 2 to 3 cm. long.
Fruit composed of numerous rounded, loosely cohering carpels, the surface very rough, with a glaucous bloom. Leaves mostly lanceolate.....10. A. squamosa.
Fruit smooth or nearly so, the surface often divided into angular areoles by impressed lines.
Leaves mostly lanceolate; fruit with conspicuous areoles, turning red when ripe.....11. A. reticulata.
Leaves elliptic-oval; fruit smooth, yellow.....12. A. lutescens.

1. **Annona globiflora** Schlecht. Linnaea 10: 235. 1836.

Annona fruticosa Sessé & Moc. Fl. Mex. ed. 2. 134. 1894.

Tamaulipas, San Luis Potosí, and Veracruz; type from Hacienda de la Laguna, near Jalapa.

Shrub, 0.6 to 2 meters high; leaves oblong or lance-oblong, 4 to 9 cm. long, thin, acute or obtuse, pale beneath; fruit subglobose, 3 to 4 cm. in diameter, muricate, with scant edible pulp. "Anonilla" (Veracruz); "chirimoya" (Tamaulipas, San Luis Potosí); "anonita de papagayos" (Veracruz).

2. **Annona longipes** Safford, Contr. U. S. Nat. Herb. 16: 269. *pl. 89.* 1913.

Known only from the type locality, Lake Catemaco, Veracruz.

Tree, 10 meters high; leaves ovate-oval, 9 to 14 cm. long, acute or acuminate; fruit shaped like a strawberry, 2.5 cm. long, covered with gibbous areoles, tomentose, with scant pulp.

3. **Annona glabra** L. Sp. Pl. 537. 1753.

Annona palustris L. Sp. Pl. ed. 2. 757. 1762.

Veracruz and Guerrero, in wet soil; reported from Yucatán, Tabasco, and Oaxaca. Widely distributed in tropical America; type from the Bahamas.

Shrub or tree, sometimes 12 meters high, the trunk as much as 50 cm. in diameter, often swollen or with buttresses at the base, the bark thin, reddish brown; leaves oval, oblong, or ovate, 6 to 15 cm. long, deep green, acute or acuminate; outer petals yellowish, with a deep red spot near the base; fruit 5 to 12 cm. long, ovoid, smooth, yellowish at maturity, with cream-colored pulp; wood brown, soft, weak, its specific gravity about 0.50. "Corcho" (Guerrero, Tabasco, Yucatán, Porto Rico); "árbol de corcho" (Veracruz); "palo de corcho" (Yucatán); "mag" (Yucatán, Maya); "cayur," "corazón cimarrón," "guanábano cimarrón," "anón" (Porto Rico); "bagá," "palo

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bobo" (Cuba); "anonillo" (Guatemala, Honduras); "guanábano de corcho" (Santo Domingo).

The tree often grows about salt water, associated with mangroves. Its English names are "pond-apple," "alligator-apple," and "monkey-apple." The fruit is insipid but is said to be eaten in some localities, while in others it is regarded as poisonous. It is said to be eaten by the alligators that frequent the banks where it grows, hence the name "alligator-apple." The very light wood is used to make bottle corks and floats for fish nets.

4. Annona muricata L. Sp. Pl. 536. 1753.

Widely cultivated in Mexico and elsewhere in tropical America, the native region not definitely known.

Small tree, usually 4 to 5 meters high; leaves ill-scented, lustrous, obovate, ovate, or elliptic, persistent; flowers yellow; fruit very large, sometimes weighing five pounds, ovoid or heart-shaped, the ill-smelling skin furnished with numerous recurved fleshy spines, the pulp white and juicy, with a pleasant subacid flavor; wood light-colored, soft, its specific gravity about 0.397. "Guanábano" or "guanábana" (Yucatán, Chiapas, Oaxaca, Nicaragua, Porto Rico, Colombia, Peru, Philippines, Santo Domingo); "anona amarilla" (Tabasco, *Ramírez*); "catuche" or "catucho" (Jalisco, *Ramírez*); "polvox" (Maya, *Urbina*); "zapote de viejas" (*Urbina*); "cabeza de negro" (Oaxaca, Jalisco); "huanaba" (Guatemala); "guanaba" (El Salvador).

The fruit of the soursop is highly esteemed in tropical regions. It is eaten fresh, used in preparing beverages, made into jelly, tarts, or preserves, and sometimes fermented to obtain an intoxicating drink. Stock also are fond of the fruit. It is reputed to have pectoral, antiscorbutic, and febrifuge properties. The seeds and green fruit are astringent and are employed as a remedy for dysentery. The leaves, too, are used medicinally, also the flowers. One of the earliest writers to describe the plant is Oviedo (Lib. VIII, Cap. XVII), who used the Haitian name "guanábano."

5. Annona purpurea Moc. & Sessé; Dunal, Monogr. Anon. 64. *pl. 2.* 1817.

Annona involucrata Baill. Adansonia **8**: 265. 1868.

Veracruz, Oaxaca, and Yucatán. Central America and Venezuela.

Small or medium-sized tree, sometimes 7.5 meters high; leaves oval to oblong, 15 to 38 cm. long, short-petiolate, acuminate, thin; petals velvety outside, deep purple within; fruit 10 to 20 cm. in diameter, broadly ovoid or subglobose, bearing numerous rigid pyramidal protuberances covered with a feltlike tomentum, the pulp orange-colored, fragrant, fibrous. "Cabeza de negro" (Veracruz); "cabeza de ilama" (Veracruz, Oaxaca); "chincua," "ilama de Tehuantepec" (Oaxaca); "soncoya," "soncolla," or "sencuya" (Central America); "toreta" (Panama); "manirote" (Venezuela); "matacuy" (Guatemala).

The fruits are sold in the markets of Veracruz and elsewhere. They vary considerably in quality. There is a popular belief that they give rise to chills and fevers.

6. Anona diversifolia Safford,[1] Science n. ser. **33**: 471. 1911.

Colima and Guerrero; type from Colima. El Salvador.

Small tree with brownish gray aromatic bark; leaves elliptic or oblong, 15 cm. long or less, rounded at apex; fruit ovoid-globose, about 15 cm. in diameter, covered with low rounded protuberances, the pulp fine-flavored, cream-colored or rose-tinted. "Ilama," "hilama," "ilamatzapotl" (Mexico); "anona blanca" (El Salvador).

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[1] See also, Safford, *Annona diversifolia*, a custard-apple of the Aztecs, Journ. Washington Acad. Sci. **2**: 118–125. *f. 1–4.* 1912.

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7. Annona palmeri Safford, Contr. U. S. Nat. Herb. **18**: 43. *pl. 24*. 1914.

Known only from the type locality, Acapulco, Guerrero.

Shrub, 1.5 to 3 meters high; leaves lanceolate or ovate, 5 to 10 cm. long, acute; flowers small, dull white; fruit subglobose, 2 to 2.5 cm. in diameter, with scant pulp. "Anonilla."

8. Annona cherimola Mill. Gard. Dict. ed. 8. *Annona* no. 5. 1768.

Widely cultivated in Mexico, and in tropical America generally. Native of the Andes of Peru, but naturalized in Mexico at a very early date.

Tree, 4.5 to 7.5 meters high; leaves mostly oval or rounded-oval, obtuse, pubescent; petals greenish yellow or rufous outside, pale yellow or whitish within; fruit globose or ovoid, the surface with rounded protuberances or marked with U-shaped areoles, sometimes smooth, the pulp white, pleasantly acidulous. "Chirimoyo" or "chirimoya" (Jalisco, Oaxaca, etc., Colombia, Peru; the name of Peruvian origin, said to signify "cold-seed"); "pox," "tzuli pox" (Yucatán, Maya); "quauhtzapotl," "matzapotl" (Nahuatl).

One of the most highly valued species because of its excellent fruit; much cultivated in the *tierra caliente*, in several forms of variable quality. The fruit is sometimes fermented to obtain an alcoholic beverage. Macfadyen states that in Jamaica the dried flowers were used to flavor snuff. The seeds are used in Mexico as an emetic-cathartic and as an insecticide. In the first case one or two seeds are swallowed; they are first roasted slightly, their shell removed, and the embryo crushed in water or milk. For the destruction of parasites upon the human body, the seeds are crushed, mixed with lard, and applied as an ointment to the parts affected. Cortina, who analyzed the seeds,[1] states that they contain sugar, gum, albumen, extractive matter, oil, and resin, the last probably being the emetic-cathartic agent.

9. Annona longiflora S. Wats. Proc. Amer. Acad. **22**: 397. 1887.

Jalisco; type from Río Blanco.

Shrub, 1 to 3 meters high; leaves mostly oval or orbicular, copiously pubescent; outer petals whitish or cream-colored, with a dark purple spot at base; fruit ovoid-globose, the surface with flat areoles or bearing protuberances. "Chirimoya de la barranca," "chirimoya cimarrona."

The fruit is edible either raw or cooked. A sweetmeat is made by boiling it with sugar together with the fruit of the "tejocote" (*Crataegus mexicana*).

10. Annona squamosa L. Sp. Pl. 537. 1753.

Annona cinerea Dunal, Monogr. Anon. 72. *pl. 8*. 1817.

Widely cultivated in Mexico and elsewhere in tropical America.

Tree, 4.5 to 6 meters high, with grayish bark; leaves lanceolate or oblong, acute; petals greenish yellow or greenish white, usually with a purplish red spot at base; fruit the size of an orange, globose or heart-shaped, composed of loosely adherent carpels, these rounded at apex, forming a tuberculate surface, greenish yellow, the pulp yellowish white, creamy or custard-like, sweet and pleasantly flavored. "Texaltzapotl," "quauhtzapotl" (Nahuatl); "ahate" (Jalisco, Veracruz); "anona blanca" (Chiapas, *Ramírez*); "saramulla," "saramullo" (Yucatán); "tzalmuy" (Yucatán, Maya); "anón" (Colombia, Costa Rica, Porto Rico); "chirimoya" (Porto Rico); "ates" (Philippines); "anón" (Santo Domingo).

Fruit of excellent flavor and highly esteemed; it is produced at nearly all times of the year. It is eaten alone or made into sherbets and is not cooked like that of some other species. The leaves are sometimes rubbed over floors or placed in hens' nests to keep away vermin. The seeds likewise have in-

[1] See Urbina, Naturaleza **7**: 222. 1901.

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secticide properties. The crushed leaves are sometimes applied as poultices to ulcers and malignant sores. The root is a drastic purgative.

The tree is described by Oviedo (Lib. VIII, Cap. XVIII) under the name "hanon." Hernández describes and figures[1] it as "ahate de Panucho (Pánuco)"; he also illustrates it,[2] without description, as "ate vel ahate de Pannuco." The English names applied to this species are "sugar-apple" and "sweetsop."

11. Annona reticulata L. Sp. Pl. 37. 1753.

Annona longifolia Sessé & Moc. Fl. Mex. ed. 2. 134. 1894.

Cultivated in Mexico and in places doubtless native. Widely cultivated in the tropics.

Tree, 4.5 to 7.5 meters high; leaves deciduous, lanceolate or oblong, acute, nearly glabrous; petals olive or yellowish, usually stained with purple within and with a dark purple spot at base; fruit 7.5 to 12.5 cm. in diameter, the surface divided into angled areoles, usually reddish or reddish brown, the pulp sweetish, insipid, tallow-like. "Quauhtzapotl" (Nahuatl); "anona" (Oaxaca, etc., Nicaragua, Philippines, Guam); "anona colorada" (Chiapas, *Ramírez*); "chirimoya" (Oaxaca, Costa Rica); "op" (Yucatán, Maya); "ilama" (*Alcocer*); "corazón" (Porto Rico); "mamón" (Cuba); "riñón" (Venezuela).

The wood is light and soft. The bark is said to have astringent and tonic properties, and that of young branches to give a useful fiber. The leaves and branches are used for tanning and are said to give a blue or black dye. The English names are "custard-apple" and "bullock's-heart."

12. Annona lutescens Safford, Contr. U. S. Nat. Herb. 18: 41. *pl. 23.* 1914.

Chiapas. Guatemala; type from Cahabón, Alta Verapaz.

Small tree with spreading branches; fruit similar to that of *A. reticulata*, but yellow. "Anona amarilla" (Guatemala).

DOUBTFUL SPECIES.

ANNONA EXCELSA H. B. K. Nov. Gen. & Sp. 5: 59. 1821. Type from La Venta del Exido. Described from sterile branches.

ANNONA LIEBMANNIANA Baill. Adansonia 8: 266. 1868. Type from Comaltepec.

43. MYRISTICACEAE. Nutmeg Family.

1. COMPSONEURA Warb. Ber. Deutsch. Bot. Ges. 13: 94. 1895.

1. Compsoneura sprucei (A. DC.) Warb. Nov. Act. Acad. Caes. Leop. Carol. 68: 143. 1897.

Myristica sprucei A. DC. in DC. Prodr. 14: 199. 1856.

Myristica mexicana Hemsl. Biol. Centr. Amer. Bot. 3: 67. *pl. 73.* 1882.

Tabasco. Honduras and Brazil; type from Rio Negro, Brazil.

Glabrous shrub or tree; leaves alternate, estipulate, oblong or obovate-oblong, 12 to 25 cm. long, subacuminate, bright green; flowers very small, dioecious, paniculate or subracemose.

Myristica mexicana is considered synonymous with *Compsoneura sprucei* by Warburg, the monographer of the group, but it seems probable that further study will show that the Mexican plant is a distinct species. The type of *M. mexicana* is from the banks of the Río Puyapatengo.

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[1] Thesaurus 348. 1651.

[2] Thesaurus 454. 1651.

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44. MONIMIACEAE. Monimia Family.

REFERENCE: Perkins in Engl. Pflanzanreich IV. 101. 1901.

Shrubs; leaves opposite, entire or irregularly serrate, estipulate; flowers small, perfect or unisexual, usually cymose or racemose; perianth 4 to 6-lobed; corolla none; stamens numerous; fruit of numerous small carpels.

Anthers dehiscent by longitudinal slits ..... 1. MOLLINEDIA.
Anthers dehiscent by valves ..... 2. SIPARUNA.

1. MOLLINEDIA Ruiz & Pav. Fl. Peruv. Chil. Prodr. 83. 1794.

Leaves entire or dentate; flowers pedicellate, in axillary cymes; perianth 4-lobed; fruit of numerous small drupes.

Sepals subequal. Stamens 30 to 33 ..... 1. M. orizabae.
Sepals unequal, the outer broader than the inner.
  Leaves pilose when young. Stamens 23 or 24 ..... 2. M. viridiflora.
  Leaves glabrous.
    Stamens 25 ..... 3. M. mexicana.
    Stamens 30 to 40 ..... 4. M. nigrescens.

1. **Mollinedia orizabae** Perkins, Bot. Jahrb. Engler 27: 674. 1900.
Known only from the type locality, Orizaba, Veracruz.
Leaves oblong or obovate-oblong, 8 to 12 cm. long, short-acuminate, glabrous.

2. **Mollinedia viridiflora** Tulasne, Ann. Sci. Nat. IV. 3: 43. 1855.
Oaxaca; type locality, mountains of Oaxaca.
Leaves obovate or elliptic-oblong, 8 to 12 cm. long, petiolate, acuminate, glabrate in age.

3. **Mollinedia mexicana** Perkins, Bot. Jahrb. Engler 27: 674. 1900.
Known only from the type locality, Mirador, Veracruz.
Leaves narrowly oblong or obovate-oblong, 9 to 13.5 cm. long, long-acuminate.

4. **Mollinedia nigrescens** Tulasne, Ann. Sci. Nat. IV. 3: 41. 1855.
Known only from the type locality, Tenejapa, Oaxaca.
Leaves lanceolate or oblong-lanceolate, 8 to 12 cm. long, remotely serrate above the middle.

2. SIPARUNA Aubl. Pl. Guian. 2: 864. 1775.

Shrubs, usually with a pleasant odor; flowers in short axillary cymes, usually short-pediceled; fruit of numerous small drupes.

Leaves copiously stellate-pilose ..... 1. S. riparia.
Leaves glabrous or nearly so.
  Leaf blades entire or sinuate-dentate.
    Leaves coriaceous ..... 2. S. andina.
    Leaves membranaceous ..... 3. S. nicaraguensis.
  Leaf blades conspicuously serrate or dentate.
    Inflorescence dense, short ..... 4. S. colimensis.
    Inflorescence lax, conspicuously pedunculate ..... 5. S. sumichrastii.

1. **Siparuna riparia** (Tulasne) A. DC. in DC. Prodr. 16[2]: 647. 1868.
Citriosma riparia Tulasne, Ann. Sci. Nat. IV. 3: 36. 1855.
Veracruz and Oaxaca. Guatemala.
Tree or shrub; leaves obovate or oval-obovate, 10 to 17 cm. long, acute or acuminate, irregularly dentate; fruit globose, red. "Limoncillo" (Veracruz); "cerbatana" (Guatemala).

2. **Siparuna andina** (Tulasne) A. DC. in DC. Prodr. 16[2]: 648. 1868.
Citriosma andina Tulasne, Ann. Sci. Nat. IV. 3: 36. 1855.
Mountains of Oaxaca.

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Leaves ternate, obovate-oblong, 12 to 15 cm. long, petiolate, short-acuminate.

3. **Siparuna nicaraguensis** Hemsl. Biol. Centr. Amer. Bot. 3: 69. 1882.

Guerrero and Oaxaca to Tabasco. Guatemala and Nicaragua (type locality).

Shrub, 3 to 4 meters high, or sometimes a tree, with a strong odor; leaves oval to oblong, 7.5 to 15 cm. long; flowers small, yellowish white; fruit blood-red. "Hierba del talaje," "limoncillo," "hierba de la conchuda" (Oaxaca).

4. **Siparuna colimensis** Perkins, Bot. Jahrb. Engler 28: 682. 1901.

Known only from Colima, the type locality.

Leaves ovate or oblong, 9 to 18 cm. long, short-acuminate; fruit depressed-globose, reddish, acidulous.

5. **Siparuna sumichrastii** (A. DC.) Perkins, Bot. Jahrb. Engler 28: 682. 1901.

Siparuna riparia sumichrastii A. DC. in DC. Prodr. 16[2]: 648. 1868.

Veracruz; type from the city of Veracruz.

Shrub, 3 meters high; leaves obovate-oblong or elliptic, 10 to 16 cm. long; fruit 5 mm. in diameter.

45. LAURACEAE. Laurel Family.

REFERENCE: Mez, Jahrb. Bot. Gart. Mus. Berlin 5. 1869.

Aromatic evergreen trees or shrubs; leaves alternate, persistent, glandular-punctate, estipulate, entire; flowers perfect or unisexual, small, green or yellow, usually cymose, umbellate, or capitate; perianth limb usually 6-lobed; corolla none; stamens and staminodia normally twice as many as the segments and opposite them, arranged in 2 or 4 series; anthers erect, 2 or 4-celled; fruit baccate or drupaceous, 1-seeded.

In this family flowers are usually necessary for determination, and fruiting specimens are of little value unless accompanied by flowers.

The common European laurel, *Laurus nobilis* L. ("laurel") is cultivated in Mexico as a shade tree. The writer has seen no material of *Acrodiclidium mexicanum* and *A. misantlae* recently described from Veracruz by Brandegee.[1] The genus is not otherwise known from Mexico, and it is probable that both these species belong to genera listed below.

The only Mexican representative of the family not listed here is *Cassytha filiformis* L., a yellowish leafless twining parasitic plant, in general appearance much like dodder (*Cuscuta* spp.).

Two well-known Old World trees of the family are *Cinnamomum camphora* (L.) Nees & Eberm., camphor ("alcánfor"), and *C. zeylanicum* Nees, cinnamon ("canela").

Inflorescence racemose, subtended by an involucre of bracts.
  Bracts of the involucre decussate-opposite ..... 1. LITSEA.
  Bracts imbricate ..... 2. UMBELLULARIA.
Inflorescence usually paniculate, sometimes racemose or capitate, not involucrate.
  Sepals very unequal, the outer ones shorter ..... 3. PERSEA.
  Sepals equal or nearly so.
    Anthers 2-celled.
      Stamens all with introrse anthers ..... 4. SASSAFRIDIUM.
      Stamens partly with extrorse anthers.
        Staminodia of the innermost stamens large ..... 5. HUFELANDIA.
        Staminodia of the innermost stamens minute or aborted. 6. MISANTECA.
    Anthers 4-celled.

[1] Univ. Calif. Bot. 6: 497. 1919.

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Staminodia of the inner series of stamens well developed, sagittate.
Sepals usually deciduous ..... 3. PERSEA.
Sepals persistent ..... 7. PHOEBE.
Staminodia of the inner stamens minute or none, stipelike.
Anther cells in pairs, one pair above the other ..... 8. OCOTEA.
Anther cells all inserted at nearly the same height ..... 9. NECTANDRA.

1. LITSEA Lam. Encycl. 3: 574. 1789.

REFERENCE: Bartlett, Proc. Amer. Acad. 44: 597–602. 1909.

Shrubs or trees; leaves comparatively small; inflorescence short-racemose, few-flowered, axillary, in bud surrounded by an involucre of 4 to 6 broad bracts; perianth 6 or 4-lobed; stamens usually 9 or 12, those of the first and second ranks eglandular, those of the third and fourth ranks usually with a stipitate gland on each side at the base; anthers introrsely 4-celled.

The aromatic leaves of all the species are used extensively for flavoring food.

Leaves copiously pubescent beneath.
Inflorescences corymbose ..... 1. L. neesiana.
Inflorescences solitary or fasciculate ..... 2. L. orizabae.
Leaves glabrous or nearly so.
Leaf blades rounded or subcordate at base.
Inflorescences corymbose or paniculate.
Pedicels much longer than the flowers ..... 3. L. pedicellata.
Pedicels shorter than the flowers ..... 4. L. pringlei.
Inflorescences solitary or fasciculate.
Leaf blades rounded-ovate, obtuse ..... 5. L. parvifolia.
Leaf blades ovate-lanceolate, acute ..... 6. L. novoleontis.
Leaf blades acute or obtuse at base.
Leaves usually glaucous beneath, more than 2 cm. wide; inflorescences corymbose ..... 7. L. glaucescens.
Leaves not glaucous beneath, 1.5 cm. wide or narrower; inflorescences solitary ..... 8. L. schaffneri.

1. **Litsea neesiana** (Schauer) Hemsl. Biol. Centr. Amer. Bot. 3: 76. 1882.

Tetranthera neesiana Schauer, Linnaea 19: 712. 1847.

? *Tetranthera villosa* Mart. & Gal. Bull. Acad. Brux. 10[2]: 359. 1843.

Veracruz to Sinaloa, Oaxaca, and Chiapas.

Tree or shrub, 2 to 9 meters high; leaves ovate, 2.5 to 5 cm. long, acute or acuminate, green and glabrous above, pale and pubescent beneath. "Laurel" (Chiapas); "laurel de la sierra" (Sinaloa).

One collection placed here by the writer was referred by Bartlett to *L. guatemalensis* Mez. The leaves are used in Sinaloa as a remedy for colic pains.

2. **Litsea orizabae** (Mart. & Gal.) Mez. Jahrb. Bot. Gart. Mus. Berlin 5: 479. 1889.

Persea orizabae Mart. & Gal. Bull. Acad. Brux. 10[2]: 358. 1843.

Known only from Mount Orizaba, at an altitude of about 4,000 meters.

Shrub; leaves ovate, about 7.5 cm. long, acute.

3. **Litsea pedicellata** Bartlett, Proc. Amer. Acad. 44: 598. 1909.

Known only from the type locality, mountains near Saltillo, Coahuila, at an altitude of 2,135 meters.

Shrub, 1 to 2 meters high; leaves orbicular-ovate, 2 to 3 cm. long, obtuse.

4. **Litsea pringlei** Bartlett, Proc. Amer. Acad. 44: 598. 1909.

Nuevo León and San Luis Potosí; type from limestone ledges of the Sierra Madre above Monterrey, Nuevo León, altitude 850 meters.

Shrub, 1 to 2 meters high; leaves ovate-lanceolate or ovate, 3 to 5 cm. long, acute or attenuate.

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5. **Litsea parvifolia** (Hemsl.) Mez, Jahrb. Bot. Gart. Mus. Berlin **5**: 481. 1889.
Umbellularia parvifolia Hemsl. Biol. Centr. Amer. Bot. **3**: 77. 1882.
Coahuila and perhaps elsewhere.
Shrub; leaves 1.3 to 4 cm. long, green above, pale beneath.

6. **Litsea novoleontis** Bartlett, Proc. Amer. Acad. **44**: 601. 1909.
Nuevo León and San Luis Potosí; type from the Sierra Madre near Monterrey.
Shrub, 1 to 5 meters high; leaves ovate or lance-ovate, 2.5 to 5.5 cm. long; fruit black. "Laurel" (San Luis Potosí).
Tea made from the leaves is used as a beverage, with the addition of sugar and milk. It is used also for asthma and to induce perspiration.

7. **Litsea glaucescens** H. B. K. Nov. Gen. & Sp. **2**: 168. 1817.
Litsea cervantesii H. B. K. Nov. Gen. & Sp. **2**: 168. 1817.
Tetranthera glaucescens subsolitaria Meissn. in DC. Prodr. **15** [1]: 193. 1864.
Litsea glaucescens subsolitaria Hemsl. Biol. Centr. Amer. Bot. **3**: 76. 1882.
Tamaulipas to Veracruz, Chiapas, and Tepic; type from Acapulco. Central America.
Tree or shrub, sometimes 6 meters high; leaves ovate or lanceolate, 5 to 8 cm. long, acute or attenuate, petiolate, glaucous or green beneath. "Laurel" (Oaxaca, Veracruz, Chiapas, Guatemala, etc.); "sufricaya" or "sufricago" (Veracruz, etc.); "ziz-uch" (Chiapas, *Seler*).
A tea made from the leaves is used as a beverage, as in the other species, also for colic, etc. *L. glaucescens subsolitaria* is a form with solitary or fasciculate (rather than corymbose) inflorescences.

8. **Litsea schaffneri** Bartlett, Proc. Amer. Acad. **44**: 601. 1909.
San Luis Potosí and Guanajuato; type from San Miguelito Mountains, San Luis Potosí.
Shrub 2 to 3 meters high; leaves narrowly lanceolate, 2 to 5 cm. long, acute. "Laurel" (San Luis Potosí).

2. UMBELLULARIA Nutt. N. Amer. Sylv. 1: 87. 1842.

1. **Umbellularia californica** (Hook. & Arn.) Nutt. N. Amer. Sylv. **1**: 87. 1842.
Tetranthera californica Hook. & Arn. Bot. Beechey Voy. 159. 1833.
Probably in northern Baja California, although no specimens from the Mexican side of the Boundary have been seen. California.
Shrub or tree, sometimes 30 meters high, with a trunk 1.6 meters in diameter, the bark scaly, brown; leaves oblong-lanceolate, 5 to 14 cm. long, acute; flowers yellow; fruit yellowish, 2 to 3 cm. long; wood light brown, strong, hard, its specific gravity about 0.65.
The fruit was eaten by the California Indians, and the leaves are sometimes used for seasoning food. The wood is used for furniture, boats, etc.

3. PERSEA Gaertn. f. Fruct. & Sem. 3: 222. 1805.

References: Blake, A preliminary revision of the North American and West Indian avocados, Journ. Washington Acad. Sci. **10**: 9–21. 1920; Popenoe, in Bailey, Stand. Cycl. Hort. 436–438, 2555–2556. 1914–16; G. N. Collins, The avocado, a salad fruit from the tropics, U. S. Dept. Agr. Bur. Pl. Ind. Bull. **77**. 1905.

Usually trees; flowers in axillary or subterminal, pedunculate panicles; perianth 6-lobed, the 3 outer lobes often smaller than the inner ones; perfect stamens 9, those of the first and second series eglandular, those of the third series with a gland on each side at the base; anthers extrorsely 4-celled; fruit small or often very large.

Species nos. 5 to 9 are referred by some authors to a separate genus, *Nothaphoebe*.

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Perianth lobes equal or subequal; flowers comparatively large.
Ovary glabrous; staminal glands sessile.....1. P. cinerascens.
Ovary pubescent; staminal glands stipitate.
Pedicels 8 to 15 mm. long; stipe of staminode 2 to 3 times as long and essentially as broad as the elliptic head. Branchlets densely ferruginous-tomentose.....2. P. schiedeana.
Pedicels 1 to 6 mm. long; staminode with triangular head much broader than the stipe.
Branchlets fulvous-villous; leaves floccose-tomentose beneath; filaments only one-third longer than the anthers.....3. P. floccosa.
Branchlets glabrous to pilosulous; leaves glabrous to pilosulous beneath; filaments 2 to 3 times as long as the anthers.
Leaves not anise-scented; perianth deciduous.....4. P. americana.
Leaves anise-(or sassafras)-scented; perianth usually persistent. 4a. P. americana drymifolia.
Perianth lobes unequal, the outer ones shorter; flowers small.
Leaves glabrous.....5. P. longipes.
Leaves pubescent, at least beneath.
Leaf blades lanceolate or oblong, about 3 cm. wide.
Leaves minutely sericeous beneath, not glaucescent.....6. P. veraguensis.
Leaves not sericeous beneath, glaucous or glaucescent.....7. P. podadenia.
Leaf blades mostly ovate, obovate, or elliptic, 3 to 10 cm. wide.
Pubescence of the lower surface of the leaves coarse, loose; inflorescence fulvous-villous.....8. P. chamissonis.
Pubescence of the lower surface of the leaves fine, appressed; inflorescence sericeous.....9. P. liebmanni.

1. **Persea cinerascens** Blake, Journ. Washington Acad. Sci. 10: 18. *f. 2.* 1920.

Known only from the type locality, Zacuapan, Veracruz.

Tree; branchlets densely pilose-tomentose; leaf blades elliptic to oval-oblong or obovate, 10 to 20 cm. long, 5 to 8 cm. wide, acute or short-pointed, pilosulous beneath; pedicels 1 mm. long; perianth 7 to 8.5 mm. long; fruit subglobose, glaucous-blue, about 12 mm. in diameter.

2. **Persea schiedeana** Nees, Syst. Laurin. 130. 1836.

Persea gratissima schiedeana Meissn. in DC. Prodr. 15[1]: 53. 1864.

Persea pittieri Mez, Bot. Jahrb. Engler 30: Beibl. 67: 15. 1901.

Veracruz and probably elsewhere; type from Misantla. Guatemala to Panama.

Tree, 15 to 20 or rarely even 50 meters high; leaf blades obovate to oval-obovate or oval, 12.5 to 30 cm. long, 7 to 15 cm. wide, obtuse or rounded and short-pointed at apex, beneath glaucous and pilosulous; perianth 6 to 8 mm. long. "Chinini" (Veracruz); "coyó," "coyoctê," "kiyó," "kiyau," "chucte," "chaucte," "shucte," "kotyó," (Guatemala); "aguacatón" (Panama).

This species is cultivated in Veracruz and is probably also indigenous there. The flowers are pale greenish yellow, turning crimson at the base in age, or sometimes light rose. The stamens also turn crimson with age, and the glands are bright orange. The flowers of *P. americana* are said to be pale green, not changing color with age.

The fruit is much like that of the common avocado, and equally variable in form and quality. The skin is thick but leathery and pliable; the flesh brownish white, of fine oily texture. The flavor is similar to that of the common avocado but distinguishable, suggesting that of a ripe coconut. The cotyledons when cut are rose-pink; in *P. americana* they are whitish.

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3. **Persea floccosa** Mez, Jahrb. Bot. Gart. Berlin 5: 148. 1889.

Known only from the type locality, Chinantla, Oaxaca.

Tree; leaf blades ovate, 11 to 17 cm. long, 5 to 7.5 cm. wide, acuminate, glaucescent beneath; perianth 5 mm. long.

4. **Persea americana** Mill. Gard. Dict. ed. 8. 1768.

Laurus persea L. Sp. Pl. 370. 1753.

Persea gratissima Gaertn. f. Fruct. & Sem. 3: 222. *pl. 221.* 1807.

Persea persea Cockerell, Bull. Torrey Club 19: 95. 1892.

Commonly cultivated in Mexico, and probably native in the southern part. Widely cultivated in tropical regions.

Tree, sometimes 20 meters high, with a trunk 60 cm. in diameter, the bark rather thin, light gray, fissured; leaves oval to elliptic, 10 to 30 cm. long, 3.5 to 20 cm. wide, acute or obtuse, copiously pubescent when young; flowers greenish; perianth 5.5 to 7 mm. long; fruit oval or pear-shaped, sometimes 18 cm. long, smooth, with thick oily pulp and a very large seed; wood rather soft, fine-grained, reddish brown or light brown, its specific gravity about 0.65.

The fruit is known in Mexico as "aguacate" or "ahuacate," from the Nahuatl "ahuacatl"[1] or "ahuacuahuitl." The following additional names are used, some of them referring to horticultural varieties: "Aguacate oloroso" (Veracruz, Oaxaca); "on" (Yucatán, Maya); "aguacate xinene," "xinene" (Oaxaca, *Reko*); "tonalahuate" (Morelos, Veracruz, *Ramirez*); "cupanda" (Tarascan); "aguacatillo" (Michoacán, Jalisco); "pahuatl" (the name of a large variety, according to Starr[2]); "pagua" (a large variety, *Robelo*); "koidium," "koitum," "kuitm" (Mixe, the fruit, *Belmar;* the tree is "kuitm-keip"); "ttatzân" (Otomí, *Buelna*); "palta" (Colombia, Ecuador, Peru; the Quechua name; Ramírez reports it as in use in Mexico, but this is doubtful); "cura" (Colombia). The best English name is "avocado," a derivative of "aguacate" This word has been variously modified, the extremes being perhaps "abogado," the Spanish word for "lawyer," and "watercats," employed by some English writers. The name "alligator-pear" is sometimes applied, but this is an objectionable name. In the various Maya dialects of Central America the names employed are "o," "oj," "ju," "un," "um," and "on."

The avocado is one of the best-known of Mexican trees, having been cultivated for many centuries. It has been introduced into most tropical regions of the world, and in recent years into southern Florida and California. It is of interest to note that the Trapp avocado, the form most commonly grown in Florida, belongs to a distinct species, of unknown origin, distinguished by having the perianth glabrous within. It has been described recently by Blake[3] as *Persea leiogyna.*

Two principal horticultural forms of *Persea americana* are recognized, the "West Indian type," with smooth fruit and leathery skin, and the "Guatemalan type," with rough or warty fruit and brittle skin. There is great variation in the size and shape of the fruit.

In tropical America the trees are grown from seeds, beginning to bear when four or five years old and continuing their production sometimes for 50 years or more. In modern practice the best forms are propagated by budding. A good-sized tree will produce as many as 500 fruits per year. The fruit has a pleasant flavor, and is usually eaten as a salad, with the addition of salt, pepper, vinegar,

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[1] This is also the Nahuatl term for testicle. It is uncertain which is the primitive meaning.

[2] Starr, In Indian Mexico, p. 245. 1908.

[3] Journ. Washington Acad. Sci. 10: 19. 1920.

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and other condiments, but sometimes it is prepared with sugar or wine. It is eaten by all kinds of domestic animals.

A large number of therapeutic uses are reported for the plant. The pulp is credited with hastening the suppuration of wounds and is reputed to have aphrodisiac and emmenagogue properties. The rind is used to expel intestinal parasites. The seeds contain a milky juice which turns red on exposure, and which produces an indelible stain on linen. Ground and mixed with cheese, meal, etc., the seeds are used to poison rats and mice. An ointment of the pulverized seeds is sometimes employed as a rubefacient, and a decoction of them, or a piece of a seed placed in the cavity of a tooth, is believed to cure toothache. The leaves and bark are employed in domestic medicine because of the pectoral, stomachic, emmenagogue, resolutive, and antiperiodic properties ascribed to them. The seeds are used also for the manufacture of various trinkets.

The avocado is noted by all the early writers upon tropical American plants. Oviedo (Lib. IX, Cap. XXIII) gives a very full account of the tree and of the fruit, which he describes as superior to the pears of Castile. Acosta gives a brief account of the fruit, under the name "palta." Sahagún writes the name "auacatl," and states that there are also other kinds besides the common one: The "tlacaçlauacatl," which women nursing dare not eat, because the fruit causes diarrhoea in the children nursed; and the "quilauacatl," or "green aguacate," a form with green skin, "and very good to eat." He states that the powdered seeds were employed as a remedy for dandruff. Hernández also gives a long account[1] of the avocado, in a chapter entitled "De *Ahuaca Quauhitl*, seu Arbore Querciformi butiraceo fructu." He describes the leaves as fragrant, and consequently doubtless refers to the Mexican type, *Persea americana drymifolia*. He states that by pressure oil was obtained from the seeds and used to cure eruptions of the skin.

4a. **Persea americana drymifolia** (Schlecht. & Cham.) Blake, Journ. Washington Acad. Sci. **10**: 15. 1920.

Persea drymifolia Schlecht. & Cham. Linnaea **6**: 365. 1831.

Nuevo León to Sinaloa, Veracruz, and Puebla; type from Papantla, Veracruz. Guatemala; cultivated in Ecuador.

Leaves usually smaller than in *P. americana*, elliptic or oval, acute or acuminate; fruit thin-skinned. "Aguacate oloroso."

This is the common Mexican avocado, and the vernacular names reported above apply also, presumably, to the variety.

5. **Persea longipes** (Schlecht.) Meissn. in DC. Prodr. **15**[1]: 55. 1864.

Laurus longipes Schlecht. Linnaea **7**: 390. 1832.

Veracruz; type from Hacienda de la Laguna; perhaps also in Guerrero.

Tree or shrub; leaves oblong or lanceolate, 8 to 15 cm. long, attenuate, green and lustrous above, paler beneath.

6. **Persea veraguensis** Seem. Bot. Voy. Herald 193. 1854.

Oaxaca and Chiapas. Type from Chiriquí, Panama.

Tree, sometimes 20 meters high; leaves 8 to 17 cm. long, acuminate, with conspicuous venation, the pubescence of the lower surface somewhat lustrous; flowers sericeous.

7. **Persea podadenia** Blake, Contr. Gray Herb. n. ser. **52**: 62. 1917.

Sonora, Durango, and Jalisco; type from San Ramón, Durango.

Shrub or tree; leaves 9 to 16 cm. long, acute or acutish, pale beneath, petiolate. "Laurel" (Jalisco); "laurel de la sierra" (Sonora).

Leaves with a flavor similar to that of sassafras; used for seasoning food.

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[1] Thesaurus 89. 1651.

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8. **Persea chamissonis** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 168. 1889.

San Luis Potosí, Veracruz, and Oaxaca; type from Chiconquiaco, Veracruz.

Small tree; leaves lance-oblong to obovate-oval, 5.5 to 11 cm. long, obtuse or acute, copiously pubescent.

9. **Persea liebmanni** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 166. 1889.

Sinaloa to Oaxaca; type from Chinantla, Oaxaca.

Tree; leaves mostly oval or oval-ovate, 10 to 18 cm. long, acute or obtuse, very thick; fruit globose, 1 cm. in diameter.

4. **SASSAFRIDIUM** Meissn. in DC. Prodr. 15 [1]: 171. 1864.

1. **Sassafridium macrophyllum** Rose, Contr. U. S. Nat. Herb. 1: 355. 1895.

Sinaloa to Veracruz and Tabasco; type from Manzanillo.

Tree, sometimes 10 meters high, nearly glabrous; leaves lance-oblong to ovate or oval-oblong, 10 to 20 cm. long, petiolate, acute or acuminate, lustrous; flowers numerous, white, sweet-scented; perianth 6-lobed, the lobes subequal; perfect stamens 9, those of the first and second series eglandular, those of the third series with 2 glands at the base; anthers 4-celled, introrse; fruit about 1 cm. long. "Laurel," "laurel blanco" (Tabasco); "aguacatillo" (Michoacán, Guerrero); "laurelón" (Sinaloa).

5. **HUFELANDIA** Nees, Pl. Laur. Expos. 11. 1833.

1. **Hufelandia mexicana** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 20. 1889.

Veracruz and Oaxaca.

Shrub or tree; leaves elliptic or ovate, acute or acuminate, green, glabrous; perianth 6-lobed; perfect stamens 9, those of the first and second series eglandular, the anthers 2-celled, introrse, the anthers of the third series extrorse, the filaments each with 2 glands at the base.

Reported from Mexico as *H. pendula* Meisn. and *Beilschmiedia pendula* Hemsl.

6. **MISANTECA** Cham. & Schlecht. Linnaea 6: 367. 1831.

Trees, nearly glabrous, with large leaves, these short-petiolate, acuminate; perianth 6-lobed; perfect stamens 3, connate into a fleshy column about the pistil, the anthers 2-celled; fruit large, partly inclosed in the cuplike accrescent calyx tube.

Flowers sessile, capitate ..... 1. **M. capitata.**
Flowers pedicellate, paniculate ..... 2. **M. jurgensenii.**

1. **Misanteca capitata** Cham. & Schlecht. Linnaea 6: 367. 1831.

Acrodiclidium glabrum T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 497. 1919.

Oaxaca and Veracruz; type from Misantla and Papantla, Veracruz. Guatemala.

Large tree; leaves oval to lance-oblong, 11 to 25 cm. long, thick and leathery; flower heads 1 to 1.5 cm. in diameter, very long-pedunculate; fruit 2.5 cm. long. "Laurel," "palo misanteco" (Veracruz); "laurel de la sierra" (Oaxaca).

The wood is said to be valuable for carpentry and cabinet work.

2. **Misanteca jurgensenii** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 102. 1889.

Oaxaca; type from Pinatepa.

Tree; leaves lance-oblong or oblong-oblanceolate, 14 to 20 cm. long, acute at the base, lustrous; fruit ellipsoid, 2.5 cm. long.

The fruit seated in the large calyx tube resembles an acorn and its cup.

7. **PHOEBE** Nees, Syst. Laurin. 98. 1836.

Trees or shrubs; leaves usually large, glabrous or pubescent, petiolate; flowers paniculate; perianth 6-lobed; perfect stamens 9, those of the first and second

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series eglandular, with introrsely 4-celled anthers, those of the third series each with 2 glands at the base, the anthers extrorsely 4-celled.

Ovary pilose ..... 1. P. pallescens.
Ovary glabrous.
  Leaves sessile, cordate ..... 2. P. amplexicaulis.
  Leaves petiolate.
    Mature leaves conspicuously soft-pilose or villous beneath, never 3-nerved.
      Filaments pilose.
        Leaves acute at base ..... 3. P. psychotrioides.
        Leaves obtuse or rounded at base ..... 4. P. mollis.
      Filaments of the outer series of stamens glabrous.
        Leaves obtuse or cordate at base.
          Filaments as long as the anthers or slightly shorter. 5. P. betazensis.
          Filaments very short or none.
            Anthers rectangular-quadrate ..... 6. P. helicterifolia.
            Anthers elliptic ..... 7. P. nectandroides.
        Leaves acute at base.
          Leaves lanceolate ..... 8. P. bourgeauviana.
          Leaves elliptic or subovate ..... 9. P. pachypoda.
    Mature leaves glabrous beneath or glabrate or short-tomentellous, never soft-pilose.
      Leaves pinninerved or very obscurely triplinerved, glabrous.
        Filaments less than one-third as long as the anthers. 10. P. subtriplinervia.
        Filaments about as long as the anthers.
          Flowers pubescent; leaves less than 3 cm. wide. 11. P. tampicensis.
          Flowers glabrous; leaves 4 to 6 cm. wide ..... 12. P. ehrenbergii.
      Leaves distinctly triplinerved.
        Flowers pilose ..... 13. P. mexicana.
        Flowers glabrous.
          Inflorescence equaling or longer than the leaves ..... 14. P. effusa.
          Inflorescence shorter than the leaves.
            Filaments partly pilose ..... 15. P. salicifolia.
            Filaments glabrous ..... 16. P. barbeyana.

1. **Phoebe pallescens** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 218. 1889.
Known only from the type locality, Orizaba.

2. **Phoebe amplexicaulis** (Cham. & Schlecht.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 216. 1889.
Persea amplexicaulis Cham. & Schlecht. Linnaea 5: 90. 1830.
Known only from the type locality, Cerro Colorado, Veracruz.
Leaves cordate-oblong, 11.5 cm. long, 3 cm. wide, coriaceous, glabrous, long-acuminate; inflorescence few-flowered.

3. **Phoebe psychotrioides** (H. B. K.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 191. 1889.
Ocotea psychotrioides H. B. K. Nov. Gen. & Sp. 2: 172. 1817.
Forests of Veracruz and Oaxaca; type from Jalapa, Veracruz.
Shrub; leaves elliptic to lance-oblong, 5 to 11 cm. long, acuminate, bright green and lustrous on the upper surface.

4. **Phoebe mollis** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 192. 1889.
Described from Mexico, the locality not known.
Leaves lanceolate, about 7.5 cm. long, acute, white-tomentose beneath.

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5. **Phoebe betazensis** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 192. 1889.

Oaxaca; type from Betaza. Guatemala.

Shrub, or perhaps sometimes a tree; leaves elliptic, oblong, or obovate, 8 to 20 cm. long, acuminate, pilose on both surfaces; panicles large, long-peduncu-late; fruit 1.5 to 2 cm. long.

6. **Phoebe helicterifolia** (Meissn.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 193. 1889.

Oreodaphne helicterifolia Meissn. in DC. Prodr. 15 [1]: 123. 1864.

Described from San Bartolo, Chiapas. Guatemala to Costa Rica.

Shrub or tree; leaves oblong, lanceolate, or elliptic, 5 to 10 cm. long, copiously pubescent, acute or acuminate, short-petiolate. "Quizarrá amarilla" (Guatemala, Costa Rica).

7. **Phoebe nectandroides** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 194. 1889.

Veracruz, Oaxaca, and Chiapas; type from Orizaba. Central America.

Tree, about 12 meters high; leaves obovate or broadly elliptic, 15 to 25 cm. long, pilose; branches of the inflorescence glabrous.

Previously reported from Mexico as *Ocotea umbrosa* Mart.

8. **Phoebe bourgeauviana** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 194. 1889.

Known only from the type locality, Córdoba, Veracruz.

Leaves lanceolate, about 10 cm. long, soft-pubescent beneath, acuminate; fruit about 1 cm. long.

9. **Phoebe pachypoda** (Nees) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 196. 1889.

Persea pachypoda Nees, Linnaea 21: 490. 1847.

Oreodaphne benthamiana Nees, Linnaea 21: 521. 1847.

Phoebe hartwegii Meissn. in DC. Prodr. 15 [1]: 30. 1864.

Persea hartwegii Hemsl. Biol. Centr. Amer. Bot. 3: 72. 1882.

Phoebe benthamiana Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 195. 1889.

San Luis Potosí, Veracruz, and Guanajuato; type from El Banco.

Shrub or tree, 3 to 7 meters high; leaves 7.5 to 12 cm. long, petiolate, acuminate, very thick, green above, pale and soft-pilose beneath; fruit 1 to 1.5 cm. long. "Aguacate cimarrón."

Fruit said to be edible.

10. **Phoebe subtriplinervia** (Meissn.) Standl.

Oreodaphne subtriplinervia Meissn. in DC. Prodr. 15[1]: 125. 1864.

Ocotea subtriplinervia Hemsl. Biol. Centr. Amer. Bot. 3: 74. 1882.

Phoebe galeottiana Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 200. 1889.

Veracruz; type from Jalapa.

Shrub or perhaps a tree, glabrous; leaves lanceolate, 4 to 6 cm. long, acuminate, coriaceous; flowers subracemose, white or yellowish, 2 mm. long.

11. **Phoebe tampicensis** (Meissn.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 200. 1889.

Oreodaphne tampicensis Meissn. in DC. Prodr. 15 [1]: 136. 1864.

Ocotea tampicensis Hemsl. Biol. Centr. Amer. Bot. 3: 74. 1882.

Ocotea angustata Blake, Contr. Gray Herb. n. ser. 52: 63. 1917.

Tamaulipas and San Luis Potosi; type from Tampico.

Tree, 6 to 10 meters high; leaves linear-lanceolate, 6 to 11 cm. long, attenuate, dark green, lustrous; fruit 1.5 to 2 cm. long.

12. **Phoebe ehrenbergii** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 201. 1889.

Type from Temascaltepec, State of Mexico; perhaps also in Oaxaca.

Leaves elliptic or elliptic-lanceolate, 12 to 16.5 cm. long, acute, glabrous.

13. **Phoebe mexicana** Meissn. in DC. Prodr. 15[1]: 31. 1864.

Persea mexicana Hemsl. Biol. Centr. Amer. Bot. 3: 72. 1882.

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Veracruz; type from Jalapa. Reported from Costa Rica.

Large tree; leaves oblong-lanceolate or oblong, 5 to 12.5 cm. long, acuminate, coriaceous, glabrous. "Quechol aguacate."

14. Phoebe effusa Meissn. in DC. Prodr. 15[1]: 33. 1864.

Persea effusa Hemsl. Biol. Centr. Amer. Bot. 3: 71. 1882.

Veracruz. Central America.

Tree, sometimes 30 meters high, with a trunk a meter in diameter, the bark grayish; leaves lanceolate to elliptic-oblong, 6 to 14 cm. long, acuminate or obtuse; flowers greenish, ill-scented; wood light brown, moderately soft, light, weak, fine-grained. "Sigua blanca" (Panama).

15. Phoebe salicifolia Nees, Linnaea 21: 488. 1847.

Persea salicifolia Hemsl. Biol. Centr. Amer. Bot. 3: 71. 1864.

Known only from the type locality, Regla, Hidalgo.

Tree, 6 meters high; leaves lanceolate or oblong-lanceolate, 6 to 10 cm. long, acuminate.

16. Phoebe barbeyana Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 209. 1889.

Known only from the type locality, Orizaba, Veracruz.

Leaves elliptic, 8 to 11 cm. long, acuminate, glabrate; fruit about 1 cm. long.

8. OCOTEA Aubl. Pl. Guian. 2: 780. 1775.

Trees or shrubs with coriaceous leaves; flowers in axillary or subterminal panicles; perianth 6-lobed; perfect stamens 9, those of the first and second series eglandular, the anthers introrsely 4-celled, those of the third series minute or sometimes wanting; fruit at first inclosed in the indurate perianth tube, later exserted.

Flowers glabrous ..... 1. O. cernua.
Flowers pubescent.
  Flowers dioecious ..... 2. O. puberula.
  Flowers perfect.
    Anthers of the two outer series sessile, foliose, not contracted at base.
      Leaves mostly 3.5 to 5 cm. wide, obtuse or acutish ..... 3. O. veraguensis.
      Leaves 7 to 15 cm. wide, acuminate ..... 4. O. perseifolia.
    Anthers of the two outer series borne on filaments, or sessile but contracted at the base, not foliose.
      Leaves tomentellous beneath, broadly elliptic ..... 5. O. rubriflora.
      Leaves barbate beneath in the axils of the veins, lanceolate or lance-elliptic.
        Staminodia conspicuous, white-pilose ..... 6. O. effusa.
        Staminodia none ..... 7. O. klotzschiana.

1. Ocotea cernua (Nees) Mez. Jahrb. Bot. Gart. Mus. Berlin 5: 377. 1889.

Oreodaphne cernua Nees, Syst. Laurin. 424. 1836.

Tabasco and Campeche. Lesser Antilles; Central America.

Tree, 6 to 8 meters high, glabrous; leaves elliptic or oval-elliptic, 8 to 17 cm. long, acuminate, petiolate. "Laurel de bajo" (Campeche).

2. Ocotea puberula Nees, Syst. Laurin. 472. 1836.

Strychnodaphne puberula Nees, Linnaea 8: 39. 1833.

Reported from Veracruz. Widely distributed in South America.

Leaves elliptic-oblong or lance-oblong, 7.5 to 20 cm. long, acute or acuminate.

3. Ocotea veraguensis (Meissn.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 240. 1889.

Sassafridium veraguense Meissn. in DC. Prodr. 15[1]: 171. 1864.

Chiapas. Central America; type from Panama.

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Small or medium-sized tree, the bark grayish, smooth or slightly rugose, aromatic, with an odor like cinnamon; leaves oblong-elliptic, 7 to 12 cm. long, glabrous; flowers white, sweet-scented; fruit 1.5 cm. long; wood hard, moderately heavy, very close-grained, durable, taking a good polish. "Canelo," "canelillo" (Costa Rica); "sigua canelo" (Panama); "palo colorado" (Nicaragua).

4. **Ocotea perseifolia** Mez & Donn. Smith, Bot. Gaz. **20**: 10. 1895.
Forests of Tabasco. Guatemala; type from Yzabal.
Tree; leaves ovate, oblong-ovate, or oval-ovate, 15 to 30 cm. long, acuminate; panicles large, many-flowered. "Laurel de chile" (Tabasco).

5. **Ocotea rubriflora** Mez, Jahrb. Bot. Gart. Mus. Berlin **5**: 279. 1889.
Known only from the type locality, Teapa, Tabasco.
Tree; leaves broadly elliptic, about 23 cm. long, acuminate.

6. **Ocotea effusa** (Meissn.) Hemsl. Biol. Centr. Amer. Bot. **3**: 73. 1882.
Oreodaphne effusa Meissn. in DC. Prodr. **15** [1]: 120. 1864.
Oaxaca; type from San Pedro Nolasco.
Leaves lanceolate, 5 to 10 cm. long, long-acuminate.

7. **Ocotea klotzschiana** (Nees) Hemsl. Biol. Centr. Amer. Bot. **3**: 73. 1864.
Oreodaphne klotzschiana Nees, Linnaea **21**: 523. 1847.
Veracruz and perhaps elsewhere.
Tree or shrub; leaves lanceolate or oblong, 5 to 8.5 cm. long, narrowly acuminate, lustrous.

9. **NECTANDRA** Roland; Rottb. Act. Litt. Univ. Hafn. **1**: 279. 1778.

Trees or shrubs with coriaceous leaves; flowers in axillary or terminal, pedunculate cymes; perianth 6-lobed; perfect stamens 9, those of the first and second series eglandular, the anthers introrsely 4-celled, those of the third series with glands at base, the anthers extrorsely 4-celled.

Nectandra rodiaei Hook., of northern South America, is the greenheart, whose wood is valuable, especially because of its great durability in water. The bark contains the alkaloids bebeerine, sipirine, and nectrandrine. It is tonic, somewhat astringent, and febrifuge, somewhat resembling cinchona in properties although greatly inferior in quality. It has been used in the treatment of intermittent and remittent fevers. The Indians of British Guiana are said to make a kind of bitter bread from the seeds, which contain nearly 50 per cent of starch.

Anthers of the outer series sessile. Flowers pubescent.
- Ovary densely tomentose ..... 1. **N. sinuata.**
- Ovary glabrous or nearly so.
  - Style equaling or longer than the ovary ..... 2. **N. reticulata.**
  - Style shorter than the ovary.
    - Young leaves conspicuously yellowish-tomentellous on the upper surface. 3. **N. pallida.**
    - Young leaves glabrous or nearly so on the upper surface. 4. **N. glabrescens.**

Anthers of the outer series conspicuously stipitate.
- Filaments of the first and second series of stamens pilose.
  - Leaves not reticulate, sericeous when young ..... 5. **N. nitida.**
  - Leaves reticulate, not sericeous ..... 6. **N. sanguinea.**
- Filaments of the first and second series of stamens glabrous.
  - Style decidedly longer than the ovary; leaves glabrous ..... 7. **N. rectinervia.**
  - Style equaling or longer than the ovary; leaves more or less pubescent beneath.
    - Flowers 6 to 9 mm. broad ..... 8. **N. concinna.**
    - Flowers 4 to 6 mm. broad ..... 9. **N. pichurim.**

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1. **Nectandra sinuata** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 402. 1889.

Oaxaca. Central America; type from Guatemala.

Tree, 12 to 15 meters high; leaves oblong, obovate, or obovate-oval, 10 to 25 cm. long, petiolate, obtuse or acute, velvety-pilose; flowers large, white within, red outside; fruit about 3 cm. long. "Aguacatillo" (Oaxaca); "quizarrá hedionda" (Costa Rica).

2. **Nectandra reticulata** (Ruiz & Pav.) Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 404. 1889.

Laurus reticulata Ruiz & Pav. Fl. Peruv. Chil. 4: *pl. 348.* 1802.

Ocotea mollis H. B. K. Nov. Gen. & Sp. 2: 164. 1817.

Nectandra mollis Nees, Syst. Laurin. 287. 1836.

Oaxaca and Veracruz. Central America and South America; type from Peru.

Tree, sometimes 40 meters high; leaves elliptic-oblong, 15 to 25 cm. long, acute or acuminate, puberulent, with conspicuous venation; flowers white.

3. **Nectandra pallida** Nees, Linnaea 21: 510. 1847.

Michoacán; also reported from Mexico, the locality not indicated but probably in Veracruz. British Guiana.

Leaves lanceolate, about 11 cm. long, acuminate, tomentellous.

4. **Nectandra glabrescens** Benth. Bot. Voy. Sulph. 161. 1844.

Tepic to Guerrero, the type region. Reported from Central America and Colombia.

Tree, 8 to 14 meters high; leaves lance-oblong to elliptic, 10 to 18 cm. long, acuminate, lustrous; flowers white.

5. **Nectandra nitida** Mez, Jahrb. Bot. Gart. Mus. Berlin 5: 461. 1889.

Type from western Mexico, the locality not indicated. Panama.

Tree, 12 to 15 meters high; leaves ovate or elliptic, about 12.5 cm. long, acuminate, sericeous when young, glabrate in age; fruit subglobose, 6 mm. long.

6. **Nectandra sanguinea** Rottb. Act. Litt. Univ. Hafn. 1: 279. 1778.

Ocotea salicifolia H. B. K. Nov. Gen. & Sp. 2: 166. 1817.

Ocotea globosa Cham. & Schlecht. Linnaea 6: 366. 1831.

Tamaulipas to Tabasco. Central America and northern South America; type from Surinam.

Shrub or small tree, sometimes 8 meters high, with a trunk nearly a meter in diameter; leaves lanceolate to elliptic, 7 to 15 cm. long, obtuse to attenuate, petiolate, lustrous; flowers white or pinkish; fruit globose, 1 cm. in diameter, black. "Piesito de paloma" (Tabasco); "aguacatillo" (Tamaulipas).

Specimens from Yucatán, reported by Mez as *N. coriacea* (Swartz) Griseb., probably belong here. *N. loesenerii* Mez. (Bull. Herb. Boiss. II. 5: 243. 1905), from Veracruz, is closely related, judging from the description.

7. **Nectandra rectinervia** Meissn. in DC. Prodr. 15[1]: 158. 1864.

Veracruz. Central America and northern South America; type from Cumaná, Venezuela.

Tree; leaves elongate-oblong, 10 to 20 cm. long, long-acuminate; flowers white or lilac.

8. **Nectandra concinna** Nees, Syst, Laurin. 322. 1836.

Veracruz and Oaxaca. Central and South America.

Tree; leaves elliptic or oblong, 9 to 16 cm. long, acute or acuminate; flowers white. "Angelino aceiteno" (Venezuela).

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9. Nectandra pichurim (H. B. K.) Mez, Jahrb Bot. Gart. Mus. Berlin **5**: 449. 1889.

Ocotea pichurim H. B. K. Nov. Gen. & Sp. **2**: 266. 1817.

Reported from Mexico by Mez, the localities not stated. Panama and South America.

Shrub or tree, sometimes 20 meters high, with white bark; leaves lanceolate or ovate-lanceolate, 10 to 19 cm. long, long-acuminate; flowers white, fragrant; fruit globose, 6 mm. in diameter.

47. HERNANDIACEAE. Hernandia Family.

Trees or shrubs; leaves alternate, entire or lobed, estipulate, petiolate; flowers inconspicuous, cymose or paniculate, unisexual; perianth 4 to 10-lobed; corolla none; stamens as many as the perianth lobes, 2-celled; fruit 1-seeded.

Leaves entire; fruit surrounded by a fleshy involucel; flowers in clusters of 3 surrounded by an involucre ..... 1. **HERNANDIA.**

Leaves usually lobed; fruit nutlike, 2 of the calyx lobes persistent, developing into winglike appendages; flowers not involucrate ..... 2. **GYROCARPUS.**

1. HERNANDIA[1] L. Sp. Pl. 981. 1753.

1. Hernandia guianensis Aubl. Pl. Guian. **2**: 848. 1775.

Veracruz. Costa Rica to the Guianas.

Tree, about 8 meters high; leaves ovate to rounded-oval, 10 to 18 cm. long, 6 to 12 cm. wide, rounded or subcordate at base, rounded and short-pointed at apex, glabrous or somewhat puberulent beneath, long-petiolate; flowers in long-stalked cymes, finely tomentulose, white. "Aguacatillo" (Costa Rica).

A single Mexican specimen has been seen by the writer, collected by Liebmann in dense forests near Pital. The specimen is in poor condition, and the specific determination consequently very doubtful.

2. GYROCARPUS Jacq. Stirp. Amer. 282. 1763.

1. Gyrocarpus americanus Jacq. Stirp. Amer. 282. *pl. 178, f. 80.* 1763.

Gyrocarpus jacquini Roxb. Pl. Corom. **1**: 2. *pl. 1.* 1795.

Gyrocarpus jacquini schiedei Schlecht. Linnaea **19**: 399. 1842.

Veracruz to Yucatán, Oaxaca, and Tepic. Central America, Colombia, and Venezuela; tropical Africa, Asia, and Australia.

Large or medium-sized tree, sometimes 20 meters high, with thick branches; leaves alternate, long-petiolate, often 30 cm. wide or larger, entire or palmately lobed; flowers small, unisexual, in broad cymes; calyx lobes accrescent in fruit and becoming 10 to 12 cm. long and about 1 cm. wide. "Palo hediondo" (Oaxaca, Guerrero, Morelos); "quitlacoctli," "quitlacotli" (Nahuatl); "xkis" or "ciis" (Yucatán, Maya); "babá" (Oaxaca, *Reko*); "palo del zopilote" (Oaxaca); "volador" (Yucatán, Venezuela, Colombia); "talalate," "gallito," "caballitos" (Nicaragua).

The wood is white and very soft and light, a cubic foot weighing about 23 pounds. It is said to take paint and varnish well, and in some places is used for making toys and light boxes. In India the seeds are strung as necklaces and rosaries.

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[1] The genus was named for Francisco Hernández; see p. 10.

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48. PAPAVERACEAE. Poppy Family.

Shrubs or small trees with colored juice; leaves alternate, entire, dentate, or lobate; flowers perfect; petals 4 or 6, sometimes none; stamens numerous; fruit a 1-celled capsule.

Herbaceous representatives of several other genera occur in Mexico.

Leaves very spiny; sepals 3. Petals large, yellow.....1. ARGEMONE.
Leaves not spiny; sepals 2.
Petals large, yellow; leaves entire, coriaceous.....2. DENDROMECON.
Petals none; leaves lobed or dentate, membranaceous.....3. BOCCONIA.

1. ARGEMONE L. Sp. Pl. 508. 1753.

1. **Argemone fruticosa** Thurb.; A. Gray, Mem. Amer. Acad. n. ser. 5: 306. 1855.

Coahuila; type from La Peña.

Shrub, 45 to 75 cm. high; leaves 2.5 to 4 cm. long, sessile, shallowly lobed, very glaucous, the lobes tipped with slender yellow spines; flowers pale yellow, 7 to 8 cm. broad.

Several other species of the genus are found in Mexico, but they are all herbs. They are known by the vernacular names "chicalote" and "cardo santo."

2. DENDROMECON Benth. Trans. Hort. Soc. Lond. II. 1: 407. 1834.

1. **Dendromecon rigidum** Benth. Trans. Hort. Soc. Lond. II. 1: 407. 1834.

Northern Baja California. California.

Shrub, 0.5 to 2.5 meters high; leaves lanceolate or lance-elliptic, 3.5 to 7 cm. long, acute, nearly sessile, very thick and conspicuously veined; flowers solitary, terminal, 4 to 5 cm. broad; capsule very slender, linear, about 6 cm. long.

3. BOCCONIA L. Sp. Pl. 505. 1753.

Shrubs or small trees with yellow or reddish juice, the stems simple or sparsely branched; leaves often very large; flowers small, in large panicles; capsule small, stipitate, dehiscent to the base; seeds solitary or few.

In Mexican literature the species are much confused, since all are similar in general appearance and have the same properties. The following references to the chemical properties of the plants may be cited: E. Armendárez, Análisis de la *Bocconia*, Estudio 4: 471; Mariano Lozano y Castro, Estudio químico de la corteza de *Bocconia*, Estudio 4: 281, 344; Villada, Estudios relativos á la *Bocconia arborea* y los alcaloides de las Papaveráceas, Naturaleza II. 2: 207–212.

Leaves entire or dentate.....1. B. integrifolia.
Leaves pinnatifid.
Lobes of the leaves narrow, long-attenuate.....2. B. arborea.
Lobes broad, rounded or acute.
Lobes acute or acutish, conspicuously dentate.....3. B. frutescens.
Lobes rounded at apex, entire or sinuate-dentate.....4. B. latisepala.

1. **Bocconia integrifolia** Humb. & Bonpl. Pl. Aequin. 1: 119. *pl. 35.* 1808.

Bocconia integrifolia mexicana DC. Reg. Veg. Syst. 2: 91. 1821.

Veracruz. Central America to Peru (type locality); Jamaica.

Branched shrub, 1 to 2 meters high; leaves oblong or oblanceolate, 15 to 25 cm. long. tomentose beneath or glabrous and glaucous.

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2. Bocconia arborea S. Wats. Proc. Amer. Acad. **25**: 141. 1890.

Durango and Sinaloa to Puebla and Oaxaca; type from Lake Chapala, Jalisco. Guatemala.

Tree, 4 to 8 meters high, the trunk sometimes 60 cm. in diameter, covered with corky bark; leaves clustered at the ends of the branches, 10 to 45 cm. long or larger, with few or numerous narrow lobes, glabrous above, beneath pale and tomentose or glabrous. "Chicalote," "chicalote de árbol" (Tepic); "llora-sangre" (Michoacán, Oaxaca, etc.); "palo amarillo" (Michoacán); "árbol de Judas," "palo de Judas" (Durango, *Patoni*); "sauco" (Durango, *Palmer*); "enguande," "inguande," "engüemba" (Michoacán, Tarascan, *Ramírez*); "mano de león" (Oaxaca); "cocoxihuitl" (Jalisco, *Ramírez*); "tlacoxihuitl" (Jalisco, Michoacán, *Ramírez*); "guachilli" (*Ramírez*); "ahuacachilli" (Morelos); "palo del diablo" (Durango, Sinaloa); "palmilla" (Sinaloa).

The bark yields a yellow dye which was used by the early inhabitants of Mexico for coloring plumes and other objects. The plant contains several alkaloids similar to those obtained from the poppy plant (*Papaver somniferum* L.). These, when injected beneath the skin, cause local anesthesia, and for this purpose they have been used by surgeons in the City of Mexico, while performing operations. The wood is useless for timber or fuel, but is sometimes employed in tanning.

The species is illustrated by Hernández,[1] and described in a chapter headed "De Enguamba." He states that the plant grows about Uruapam, and that an oil extracted from the fruit is employed for dissolving tumors and cleansing ulcers. On page 158 of the Thesaurus Hernández figures and describes another plant under the heading "De Cocoxihuitl, seu herba acri." The figure may represent either *Bocconia arborea* or *B. frutescens*. Hernández's description is based upon a plant in the gardens of the King of Texcoco, where, he says, he "studied the plant for some days." He gives the meaning of the Nahuatl name as "hot-herb," but it may be that it should be translated rather "yellow-herb," an allusion to the color of the juice. He gives the following account of the names and medicinal properties of the plant: "The plant is hot and dry in the fourth degree, and possesses a certain astringency. The shoots, deprived of the bark, dissipate films and ulcers of the eyes. The juice relieves wind on the stomach, cures eruptions (as does the fruit also), and alleviates pains of cold origin. The leaves, crushed and applied as a poultice, heal old wounds and dissolve warts. Some call this tree *Quauh chilli*, because of its acrid and burning flavor, like that of the peppers called *Chilli* by the Mexicans. It grows in temperate or hot regions, as well as in gardens. Some call it also *Totolinyzochtl*, or pigeon-flower, and some *Tlacoxihuitl*, [rod-herb]."

3. Bocconia frutescens L. Sp. Pl. 505. 1753.

Bocconia frutescens cernua Moc. & Sessé; DC. Reg. Veg. Syst. **2**: 90. 1821.

Tamaulipas, San Luis Potosí, and Veracruz. Central America to Peru; West Indies.

Shrub or tree, 1 to 7.5 meters high, the stems with large white pith, covered with smooth pale bark; leaves 12 to 40 cm. long or larger, petiolate, usually with numerous lobes, tomentose or sometimes glaucous beneath; flowers purplish; fruit usually glaucous. "Gordolobo" (Veracruz); "cuatlataya" (*Ramírez*); "calderón" (Tamaulipas); "llora-sangre" (Veracruz); "guacamayo," "tabaquillo" (Costa Rica); "palo amarillo," "palo amargo" (Cuba); "palo de pan

[1] Thesaurus 97. 1651.

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cimarrón," "pan cimarrón" (Porto Rico); "curarador," "trompeto," "sarno," "mata-chande," "sarcillejo" (Colombia); "sangre de toro" (Guatemala); "sancho amargo" (Argentina, Uruguay); "yagrumo macho" (Santo Domingo). Probably some of the other names listed for *B. arborea* are applied also to this species.

The plant contains an alkaloid, protopine. The yellow or orange juice is very bitter and acrid and has a disagreeable odor. It is used for treating ulcers, skin eruptions, chilblains, bronchitis, and chronic ophthalmia, and to remove warts, and is said to have vermifuge and purgative properties. The leaves, too, are sometimes heated and applied as a poultice to wounds. In Colombia an infusion of the roots is valued as a remedy for jaundice and dropsy. In Jamaica, it is stated, the leaves are rubbed on house floors to keep away insects, and in Colombia the oil extracted from the seeds is used to destroy vermin on the head and skin.

Robelo gives as vernacular names in Mexico "cocojegüite" (from *cococxihuitl*), "clacojegüite" (from *tlacoxihuitl*), and "guachichile" or "guachichil" (from *cuau-chilli*, "tree-chile"). He states that the plants were used in preconquest days to adorn the temples.

4. Bocconia latisepala S. Wats. Proc. Amer. Acad. **25**: 141. 1890.

Nuevo León; type from Guajuco.

Plants 1 to 2 meters high, with numerous stems; leaves 14 to 30 cm. long, with few broad lobes, pale beneath. "Mala mujer."

This plant is said to be a herbaceous annual, but it is so closely similar to the other species, all of which are fruticose, that it seems best to include it here.

49. CAPPARIDACEAE. Caper Family.

Shrubs or trees; leaves alternate, stipulate or estipulate, simple and entire or palmately compound; flowers mostly perfect, often large and showy; sepals 4 to 8, free or connate; petals 4 or rarely none; stamens 6 to many; fruit capsular or baccate.

Many herbaceous representatives of the family occur in Mexico.

Leaves compound.
- Fruit an inflated capsule; leaves glaucous ..... 1. ISOMERIS.
- Fruit baccate; leaves green.
  - Petals 4; fruit long-stipitate ..... 5. CRATAEVA.
  - Petals none; fruit sessile ..... 7. FORCHAMMERIA.

Leaves simple. Fruit baccate.
- Petals none ..... 7. FORCHAMMERIA.
- Petals present.
  - Petals blue; leaves 1 cm. long or shorter ..... 6. SETCHELLANTHUS.
  - Petals never blue; leaves much more than 1 cm. long.
    - Sepals connate. Fruit large, with hard pericarp, sessile. 2. MORISONIA.
    - Sepals distinct or nearly so.
      - Stamens numerous; sepals all similar in size ..... 3. CAPPARIS.
      - Stamens 9 to 12; inner sepals smaller than the outer. 4. ATAMISQUEA.

1. ISOMERIS Nutt.; Torr. & Gray, Fl. N. Amer. 1: 124. 1838.

1. Isomeris arborea Nutt.; Torr. & Gray, Fl. N. Amer. 1: 124. 1838.

Baja California and western Sonora. California, the type from San Diego.

Shrub, 1 to 2 meters high, or sometimes herbaceous, ill-scented, the wood hard and yellow, the young branches glaucous; leaflets 3, oblong, 2 to 3 cm.

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long, obtuse or acutish; flowers racemose, 1.5 cm. long, yellow; calyx 4-lobed; stamens 6; fruit acute or attenuate, 4 to 6 cm. long.

The Coahuilla Indians of southern California eat the green pods after cooking them with hot stones in a hole in the ground.

2. MORISONIA L. Sp. Pl. 503. 1753.

1. **Morisonia americana** L. Sp. Pl. 503. 1753.

Sinaloa to Oaxaca. Lesser Antilles; northern South America.

Shrub or small tree, sometimes 7 meters high, with sparse stellate or lepidate pubescence; leaves long-petiolate, oblong or ovate-oblong, 12 to 25 cm. long, obtuse or acute, very thick, lustrous, nearly glabrous; flowers in lateral corymbs, rather large, white; petals 4; fruit baccate, many-seeded, globose, 3.5 to 6 cm. in diameter, brownish and rough outside. "Chicozapote" (Oaxaca); "árbol del diablo" (Colima, Colombia); "chico" (Sinaloa); "cacao cimarrón," "rabo de mico" (Colombia).

In the West Indies aperitive and antihysteric properties are attributed to the infusion of the flowers, which is used also as a remedy for intestinal parasites; and the pulp of the fruit is said to be used in reducing inflammation.

3. CAPPARIS L. Sp. Pl. 503. 1753.

REFERENCE: Eichler in Mart. Fl. Bras. 13 [1]: 267–288. *pl. 60–65.* 1865.

Shrubs or trees, glabrous or pubescent, the pubescence often stellate or lepidote; leaves simple, petiolate, usually thick and leathery; flowers usually large and white; sepals 4; petals 4; fruit baccate, variable in form.

The fruits of some Australian species are eaten by the natives. *Capparis spinosa* L., of the Mediterranean Region, produces the capers ("alcaparras") of commerce. These are the flower buds and young fruits preserved in vinegar with some salt. Capers are the basis of an important industry in some parts of southern Europe. It is stated that in Provence 1,760,000 pounds are harvested annually.

Indument none or of simple hairs.
- Sepals rounded.
  - Leaf blades obtuse or rounded at base, usually emarginate at apex. Plants glabrous; fruit torulose, smooth ..... 1. C. flexuosa.
  - Leaf blades subcordate or emarginate at base, rounded or acute at apex.
    - Plants glabrous; leaves mostly 4 to 8.5 cm. wide; fruit smooth; stamens not longer than the petals ..... 2. C. baducca.
    - Plants usually more or less pubescent; leaves 1.5 to 4 cm. wide; fruit verrucose; stamens much longer than the petals ..... 3. C. verrucosa.
- Sepals acute.
  - Petioles 3 to 8 mm. long ..... 4. C. oxysepala.
  - Petioles 13 to 50 mm. long ..... 5. C. longipes.

Indument of scales or of branched hairs.
- Sepals valvate in bud.
  - Leaves linear. Fruit stipitate ..... 6. C. angustifolia.
  - Leaves elliptic or oblong.
    - Fruit stipitate ..... 7. C. cynophallophora.
    - Fruit sessile ..... 8. C. odoratissima.
- Sepals open in bud.
  - Indument of the leaves chiefly or wholly of stellate hairs.
    - Leaf blades oblanceolate, densely stellate-pubescent on the upper surface. 9. C. asperifolia.
    - Leaf blades elliptic or lanceolate, soon glabrous on the upper surface. 10. C. incana.

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Indument of the leaves chiefly of scales.
Stipe of the fruit 2.5 cm. long, slender ..... 11. C. indica.
Stipe 1.5 cm. long or shorter, very stout ..... 12. C. pringlei.

1. **Capparis flexuosa** L. Sp. Pl. ed. 2. 722. 1762.
Morisonia flexuosa L. Amoen. Acad. 5: 398. 1760.
? *Capparis brevisiliqua* DC. Prodr. 1: 251. 1824.

Tamaulipas to Yucatán, Colima, and Sinaloa. Widely distributed in tropical America; type from Jamaica.

Shrub or tree, 2.5 to 8 meters high, glabrous; leaves oblong to obovate, 3 to 6.5 cm. long, short-petiolate, rounded or retuse at apex; flowers white or pale rose, fragrant, the stamens white, very long; fruit siliquiform, 7 to 15 cm. long, torulose, the seeds imbedded in scarlet pulp. "Xpayumak" or "xbayumak" (Yucatán, Maya); "pan y agua," "guayabo de loro" (Venezuela); "burro," "palo de burro" (Porto Rico); "mostaza" (Cuba, Santo Domingo).

This species has been known generally as *C. cynophallophora* L.[1] The root has a flavor resembling that of horse-radish. In the West Indies an infusion of it has been used for dropsy and as an emmenagogue and a decoction of the leaves for cutaneous diseases. Sedative and antispasmodic properties are attributed to the fruit, and diuretic and emmenagogue properties to the bark. For an illustration of a fruiting branch see Contr. U. S. Nat. Herb. 8: *pl. 23*.

2. **Capparis baducca** L. Sp. Pl. 504. 1753.
Capparis frondosa Jacq. Enum. Pl. Carib. 25. 1760.

Tamaulipas and Veracruz. Central America, West Indies, and northern South America.

Shrub or small tree, 2 to 7.5 meters high; leaves long-petiolate, elliptic or ovate, 11 to 30 cm. long, very thick; flowers greenish white or purplish; fruit 3 to 5 cm. long, purple brown. "Tinto," "naranjuelo," "fruta de burro" (Colombia); "palo de burro," "sapo" (Porto Rico); "ajito" (Venezuela).

The fruit is reputed poisonous. Medical properties similar to those of *C. flexuosa* are attributed to the plant.

3. **Capparis verrucosa** Jacq. Stirp. Amer. 159. *pl. 99*. 1763.
Capparis palmeri Rose, Contr. U. S. Nat. Herb. 1: 301. 1895.

Sinaloa to Chiapas. Central America, West Indies, Colombia, and Venezuela.

Shrub or small tree, 1 to 6 meters high; leaves nearly sessile, oblong or obovate-oblong, 3.5 to 8.5 cm. long; flowers large, white, with long stamens; fruit oblong, 2.5 to 6 cm. long, densely tuberculate. "Limoncillo" (Guerrero); "coquito" (Oaxaca); "ajito" (Venezuela); "palo de burro" (Porto Rico).

4. **Capparis oxysepala** C. Wright; Radlk. Sitzungsb. Math. Phys. Acad. Wiss. München 14: 172. 1884.

Guerrero and Yucatán. Nicaragua (type locality).

Plants glabrous or nearly so; leaves short-petiolate, oval-oblong to oval-obovate, 7 to 15 cm. long, acutish to rounded at apex, bright green, lustrous; flowers large, racemose, long-pedicellate.

5. **Capparis longipes** Standl.
Capparis discolor Standl. Contr. U. S. Nat. Herb. 20: 182. 1919. Not *C. discolor* Donn. Smith, 1897.

Known only from the type locality, banks of the Río Petatlán, Guerrero.

Tree, 8 to 10 meters high; flowers white, with the odor of orange blossoms. "Naranjillo."

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[1] See Fawcett and Rendle, Journ. Bot. Brit. & For. 52: 142–144. 1914.

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6. Capparis angustifolia H. B. K. Nov. Gen. & Sp. **5**: 96. *pl. 438.* 1821.

Type from Cañada de Zopilote, between Mexico and Acapulco.

Plants lepidote-pubescent; leaves short-petiolate, rounded or subcordate at base; flowers white.

7. Capparis cynophallophora L. Sp. Pl. 504. 1753.

Capparis jamaicensis Jacq. Enum. Pl. Carib. 23. 1760.

Yucatán. Southern Florida, West Indies, Central America, and Venezuela; type from Jamaica.

Slender shrub or tree, 1.8 to 15 meters high; leaves petiolate, elliptic, 5.5 to 9 cm. long, acute, thick, green and lustrous on the upper surface, scaly beneath; flowers white, changing to purplish, fragrant, the filaments purplish, the anthers yellow; fruit slender, sometimes 30 cm. long or longer. "Carbonero" (Cuba); "burro," "bejuco inglés," "palo de burro prieto" (Porto Rico); "olivo" (Santo Domingo).

Known in the Bahamas as "wild orange."

8. Capparis odoratissima Jacq. Pl. Hort. Schönbr. **1**: *pl. 110.* 1797.

Oaxaca. Central America to Venezuela (type locality).

Shrub or small tree; leaves obovate, petiolate, 5 to 8 cm. long, rounded at the apex, green above, covered with brown or yellowish scales beneath; flowers corymbose. "Naranjillo" (Oaxaca).

9. Capparis asperifolia Presl, Reliq. Haenk. **2**: 86. 1836.

?*Capparis cuneiformis* Sessé & Moc. Pl. Nov. Hisp. 87. 1887.

Capparis langlassei Briq. Ann. Cons. Jard. Genève **17**: 392. 1914.

Michoacán and Guerrero; type from Acapulco.

Tree, 4 to 6 meters high; leaves short-petiolate, acute, about 9 cm. long, densely stellate-pubescent on both surfaces; flowers white, racemose.

10. Capparis incana H. B. K. Nov. Gen. & Sp. **5**: 94. 1821.

Capparis pauciflora Presl, Reliq. Haenk **2**: 86. 1836.

Capparis karwinskiana Schlecht. Linnaea **10**: 237. 1836.

? *Capparis umbellata* Sessé & Moc. Pl. Nov. Hisp. 87. 1887.

Tamaulipas to Yucatán, Oaxaca, and Guerrero; type collected between Mescala and Estola.

Shrub or tree, the pubescence of grayish or rusty stellate hairs; leaves petiolate, 4.5 to 8 cm. long, acuminate or attenuate, thin; flowers white; fruit globose or oblong, 2.5 cm. long or shorter, densely pubescent. "Vara blanca" (Tamaulipas).

Perhaps not distinct from *C. ferruginea* L., of the West Indies.

11. Capparis indica (L.) Fawc. & Rendle, Journ. Bot. Brit. & For. **52**: 144. 1914.

Breynia indica L. Sp. Pl. 503. 1753.

Capparis breynia L. Syst. Nat. ed. 10. 1071. 1759.

Capparis amygdalifolia Jacq. Enum. Pl. Carib. 24. 1760.

Capparis amygdalina Lam. Encycl. **1**: 608. 1785.

Sinaloa to Oaxaca. Central America, West Indies, Colombia, and Venezuela.

Shrub or small tree, 2 to 7.5 meters high; leaves linear to obovate, 5 to 8 cm. long, petiolate, acute or obtuse; flowers white; fruit slender, torulose, 6 to 25 cm. long. "Colorín" (Michoacán, Guerrero); "mangle de la sierra" (Sinaloa); "escremento" (Nicaragua); "auso," "tinto" (Colombia).

Reputed to have medicinal properties similar to those of *C. flexuosa.*

12. Capparis pringlei Briq. Ann. Cons. Jard. Genève **17**: 300. 1914.

Oaxaca; type from Tomellín Canyon.

Small tree.

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DOUBTFUL SPECIES.

CAPPARIS FURFURACEA Ruiz & Pav.; DC. Prodr. 1: 252. 1824. Described from Mexico.

4. ATAMISQUEA Miers, Trav. Chile 2: 529. 1826.

1. **Atamisquea emarginata** Miers, Trav. Chile 2: 529. 1826.

Dry plains and hillsides, Baja California and Sonora. Argentina.

Densely branched shrub, 1 to 6 meters high, ill-scented, with brittle branches; leaves linear or oblong-linear, 1 to 3.5 cm. long, short-petiolate, emarginate at the apex, green on the upper surface, scaly beneath; flowers small, solitary or fasciculate, sweet-scented; sepals and petals each 4; fertile stamens 6; fruit oval or subglobose, about 8 mm. long.

5. CRATAEVA L. Sp. Pl. 444. 1753.

Shrubs or trees; leaves deciduous, very long-petiolate, the leaflets 3; flowers racemose or corymbose, the stamens long-exserted; petals 4; stamens 8 to 20; fruit baccate, large, long-stipitate.

Leaflets glabrous ..... 1. C. tapia.
Leaflets puberulent beneath ..... 2. C. palmeri.

1. **Crataeva tapia** L. Sp. Pl. 444. 1753.

Tamaulipas to Sinaloa and southward nearly throughout the lower parts of Mexico. West Indies, Central America, and South America.

Glabrous tree, usually 6 to 9 meters high, but sometimes as much as 18 meters; bark grayish brown; leaflets ovate, elliptic, or oval, 5.5 to 15 cm. long, thin, acute or acuminate, paler beneath; flowers green or purplish; fruit subglobose, 2.5 to 5.5 cm. in diameter. "Zapotillo amarillo" (Colima); "Tres Marías" (Yucatán); "xkolocmax" (Yucatán, Maya); "cascarón" (Tabasco); "palo de guaco" (Panama); "manzana de playa" (Nicaragua); "zorrocloco" or "sorrocloco" (Colombia); "toco" (Trinidad, Venezuela).

The bark has a disagreeable odor; it is reputed to have tonic, stomachic, antidysenteric, and febrifuge properties. The roots are very acrid, and their juice applied to the skin produces blisters. The leaves are sometimes used as poultices.

It may be that *C. gynandra* L. (if that species is distinct from *C. tapia*) also occurs in Mexico, but the specimens seen afford no convincing evidence to that effect.

2. **Crataeva palmeri** Rose, Contr. U. S. Nat. Herb. 1: 301. 1895.

Sinaloa and Durango to Guerrero; type from Armería, Colima.

Shrub or small tree, with purplish flowers, the stamens long-exserted; fruit 3.5 to 5 cm. long.

Very similar to *C. tapia* except for the presence of pubescence.

6. SETCHELLANTHUS T. S. Brandeg. Univ. Calif. Publ. Bot. 3: 378. 1909.

1. **Setchellanthus caeruleus** T. S. Brandeg. Univ. Calif. Publ. Bot. 3: 378. 1909.

Known only from the type locality, Coscomate, Oaxaca.

Shrub; leaves ovate to suborbicular, 1 cm. long or shorter, subsessile, obtuse, silvery-strigose; flowers solitary, blue, about 2 cm. long; stamens shorter than the sepals.

7. FORCHAMMERIA Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1853: 93. 1854.

Trees, glabrous or pubescent; leaves simple or compound, petiolate; flowers small, racemose or paniculate; stamens numerous.

Leaves trifoliolate ..... 1. F. trifoliata.

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Leaves simple.
  Leaves glabrous, lanceolate, ovate, or oblanceolate to oblong.
    Leaves obtuse ..... 2. F. pallida.
    Leaves acute or acuminate ..... 5. F. lanceolata.
  Leaves hirtellous, especially beneath, linear.
    Leaf blades emarginate at base; fruiting pedicels 3 to 5 mm. long; fruit 7 to 12 mm. broad ..... 3. F. watsoni.
    Leaf blades usually attenuate at base; fruiting pedicels 10 to 15 mm. long; fruit 12 to 15 mm. broad ..... 4. F. macrocarpa.

1. **Forchammeria trifoliata** Radlk. Field Mus. Bot. 1: 399. 1898.

Yucatán.

Tree, 6 to 9 meters high; leaves long-petiolate; leaflets obovate-oblong, 7 to 13 cm. long, thick, glabrous; flowers in rather large panicles. "Tres Marías."

2. **Forchammeria pallida** Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1853: 94. 1854.

Forchammeria apiocarpa Radlk. Meth. Bot. Syst. 54. 1883.

Colima to Oaxaca; type collected between Tehuantepec and Mazatlán.

Tree, 4.5 to 6 meters high, the trunk 12 to 20 cm. in diameter; leaves narrowly oblong or oblanceolate, 6 to 11 cm. long, usually rounded at apex; flowers green, in short or long racemes; fruit subglobose, 1.5 to 2 cm. long, somewhat glaucous.

3. **Forchammeria watsoni** Rose, Contr. U. S. Nat. Herb. 1: 302. 1895.

Baja California, Sonora, and Sinaloa; type from Guayamas, Sonora.

Shrub or tree, 3 to 7.5 meters high, often with a broad spreading crown; leaves 6 to 12 cm. long, very thick, with conspicuous venation, the margins revolute; flowers racemose; fruit globose-obovoid. "Palo San Juan" (Baja California).

4. **Forchammeria macrocarpa** Standl. Contr. U. S. Nat. Herb. 20: 183. 1919.

Known only from the type locality, San Luis Tultitlanapa, Puebla.

Leaves 9 to 17 cm. long, acute or acutish.

5. **Forchammeria lanceolata** Standl. Contr. U. S. Nat. Herb. 20: 183. 1919.

Known only from the type collection, from somewhere in Mexico.

Shrub, 3 to 4.5 meters high; leaves mostly lanceolate, 6 to 8 cm. long, 1.5 to 3 cm. wide, obtuse at base; fruit about 12 mm. long.

50. MORINGACEAE. Horseradish Tree Family.

1. MORINGA Juss. Gen. Pl. 348. 1789.

1. **Moringa oleifera** Lam. Encycl. 1: 398. 1783.

Guilandina moringa L. Sp. Pl. 381. 1753.

Moringa pterygosperma Gaertn. Fruct. & Sem. 2: 314. 1791.

Moringa moringa Millsp. Field Mus. Bot. 1: 490. 1902.

Common in cultivation in Mexico and often growing without cultivation. Native of Africa and the East Indies; widely cultivated and naturalized in tropical America.

Tree, 3 to 6 meters high or larger, with whitish bark, the roots thick, soft; leaves alternate, twice or thrice pinnate; flowers paniculate, sweet-scented, the 5 petals white or yellowish white, tinged with crimson outside near the base; perfect stamens 5; fruit a long 3-angled capsule; seeds winged. "Paraíso blanco" (Yucatán); "paraíso de España" (Campeche); "perlas del Oriente" (Guerrero, Oaxaca); "árbol de las perlas," "chinto borrego" (Oaxaca); "acacia" (Tamaulipas); "paraíso francés," "palo jeringa" (Cuba); "marango" (El Salvador, Nicaragua, Costa Rica); "angela" (Porto Rico); "narango," "marenque," "paraíso extranjero," "teberinto" (El Salvador).

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The usual English name is "horseradish tree." The roots have the odor and flavor of horseradish (*Armoracia rusticana* Gaertn. Mey. & Schreb.), for which they are sometimes substituted; a decoction of them is used in Nicaragua for dropsy, and their juice is applied as a rubefacient or counter-irritant. The wood is said to yield a blue dye. The leaves and young branches are relished by stock and are sometimes cut for fodder. In India the young leaves, pods, and flowers are cooked and eaten. The leaves are sometimes applied as a poultice to sores, and they are said to have purgative properties. The seeds yield the "ben" oil of commerce, which is used for lubricating watches and other delicate machinery. The oil is odorless and never becomes rancid, consequently it is useful in the manufacture of perfumes. It is very acrid and has purgative properties, but its use is somewhat dangerous if taken internally. It is sometimes applied externally for cutaneous diseases.

51. CRASSULACEAE. Orpine Family.

REFERENCE: Britton & Rose, N. Amer. Fl. **22**: 7–74. 1905.

The species listed below are scarcely to be regarded as true shrubs, and other Mexican species probably have equal claims to a place here. Many herbaceous representatives of the family occur in Mexico.

1. SEDUM L. Sp. Pl. 430. 1753.

Very succulent erect plants; leaves alternate, entire; flowers small, perfect; calyx 4 or 5-lobed; petals 4 or 5; stamens 8 or 10; fruit of 4 or 5 follicles.

Leaves terete ..... 1. S. bourgaei.
Leaves flat, at least on the upper side.
  Petals yellow or purplish red.
    Petals purplish red ..... 2. S. oxypetalum.
    Petals yellow ..... 3. S. dendroideum.
  Petals white.
    Leaves linear ..... 4. S. frutescens.
    Leaves oblong to spatulate.
      Leaves very turgid, narrowly oblong ..... 5. S. lenophylloides.
      Leaves flat, obovate or spatulate.
        Flowers pedicellate ..... 6. S. tortuosum.
        Flowers sessile ..... 7. S. retusum.

1. **Sedum bourgaei** Hemsl. Diag. Pl. Mex. 11. 1878.

Mexico to Michoacán; type from San Nicolás, Valley of Mexico.

Low shrub, much branched; leaves 1 to 2 cm. long; flowers white or pink, cymose.

2. **Sedum oxypetalum** H. B. K. Nov. Gen. & Sp. **6**: 45. 1823.

Mountains and lava beds of the State of Mexico.

Shrub, often a meter high, with very thick stems, the bark exfoliating in thin yellowish sheets; leaves spatulate, 1 to 1.5 cm. long, rounded at apex; flowers in leafy cymes.

3. **Sedum dendroideum** Moc. & Sessé; DC. Mém. Crass. 37. *pl. 9.* 1828.

Hidalgo, Veracruz, Mexico, and Puebla, on cliffs.

Branched shrub, a meter high or less, often forming dense masses; leaves 2 to 4 cm. long. "Siempreviva," "texiote," "texiotl" (Mexico).

The juice is astringent and is used for hardening the gums, and for hemorrhoids, chilblains, dysentery, etc. Applied to the forehead, it is believed to stop nosebleed.

4. **Sedum frutescens** Rose, Contr. U. S. Nat. Herb. **13**: 298. 1911.

Morelos.

Low shrub; leaves 2 to 6 cm. long, acute, bright green.

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5. **Sedum lenophylloides** Rose, Contr. U. S. Nat. Herb. **13**: 298. 1911.
Tamaulipas and Nuevo León; type from Monterrey.
Low shrub, about 30 cm. high; leaves 1 to 1.5 cm. long, pale, often purplish.

6. **Sedum tortuosum** Hemsl. Diag. Pl. Mex. 10. 1878.
Described from Mexico, the locality not known.
Low glabrous shrub with thick branches; leaves 2.5 cm. long.

7. **Sedum retusum** Hemsl. Diag. Pl. Mex. 51. 1880.
San Luis Potosí.
Low glabrous shrub; leaves sessile, 1 to 1.5 cm. long.

52. HYDRANGEACEAE. Hydrangea Family.

REFERENCE: Small & Rydberg, N. Amer. Fl. **22**: 159–178. 1905.

Trees or shrubs, rarely scandent; leaves opposite, estipulate, entire or dentate; flowers perfect, often large and showy; sepals and petals 4 or 5 each; stamens 8 to many; fruit a capsule.

Capsule ovoid, the beaks arising gradually from the body.
Filaments not appendaged; sepals and petals each 5; stamens 10. **4. FENDLERELLA.**
Filaments appendaged under the anthers; sepals and petals each 4; stamens 8 ..... **5. FENDLERA.**

Capsule urceolate or obovoid, the beak or beaks rising abruptly from the body.
Petals valvate, very small; stamens 8; inflorescence involucrate. **1. HYDRANGEA.**
Petals convolute or imbricate, large; stamens 12 to 60; inflorescence not involucrate ..... **2. DEUTZIA.**
Capsule subglobose; petals imbricate.
Capsule obovoid or obconic; petals convolute ..... **3. PHILADELPHUS.**

1. HYDRANGEA L. Sp. Pl. 397. 1753.

1. **Hydrangea oerstedii** Briq. Ann. Cons. Jard. Genève **20**: 407. 1919.
Cornidia radiata Oerst. Nat. For. Kjöbenhavn Vid. Medd. **1856**: 42. 1856. Not *Hydrangea radiata* Walt. 1788.
Reported from Veracruz and the Sierra Madre. Costa Rica and Panama.
Scandent shrub; leaves oblong or oblong-elliptic, about 12 cm. long and 6 cm. wide, leathery, petiolate, obtuse, entire or nearly so, almost glabrous; flowers small, pink, cymose, the inflorescence covered with large rounded bracts before expansion; petals 2.5 mm. long.

The identification of the Mexican specimens is doubtful, but they probably belong here. They have been reported as *Hydrangea peruviana* Moric. and as *Cornidia peruviana* (L.) Small.

Hydrangea opuloides Koch. (*H. hortensia* DC.), the common cultivated hydrangea, native of China and Japan, is grown in Mexico under the name "hortensia."

2. DEUTZIA Thunb. Nov. Gen. 1: 19. 1781.

Shrubs, the pubescence of stellate hairs; leaves deciduous, shallowly dentate, petiolate; flowers small, white, cymose.

Most of the species of the genus are natives of eastern Asia, and some are cultivated for their showy flowers. The Mexican species have been placed in a separate genus, *Neodeutzia*, by Small, but they differ in no important respect from the Old World forms.

Petals 5 to 6 mm. long ..... **1. D. mexicana.**

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Petals 3 to 4 mm. long.
Tomentum of the lower surface of the leaves of similar, very closely appressed hairs.....2. D. pringlei.
Tomentum of unequal, loose, and spreading hairs.....3. D. occidentalis.

1. **Deutzia mexicana** Hemsl. Diag. Pl. Mex. 9. 1878.
Neodeutzia mexicana Small, N. Amer. Fl. 22: 162. 1905.
Veracruz; type from Orizaba.
Shrub, 2 to 5 meters high; leaves ovate, 2.5 to 5 cm. long, white-pubescent beneath.

2. **Deutzia pringlei** C. Schneid. Mitt. Deutsch. Dendr. Ges. 1904: 186. 1904.
Neodeutzia ovalis Small, N. Amer. Fl. 22: 162. 1905.
Neodeutzia pringlei Small & Rydb. N. Amer. Fl. 22: 555. 1918.
Known only from the type locality, San José Pass, San Luis Potosí.
Shrub, 3 meters high; leaves oval or oblong, 1.5 to 2.5 cm. long, rounded at apex, green on the upper surface, white beneath.

3. **Deutzia occidentalis** Standl. Proc. Biol. Soc. Washington 31: 134. 1918.
Neodeutzia occidentalis Rydb. N. Amer. Fl. 22: 555. 1918.
Puebla and Oaxaca; type from Barranca del Oro, Puebla.
Shrub, sometimes 4.5 meters high; leaves ovate-orbicular or ovate, 2.8 to 4.5 cm. long.

3. PHILADELPHUS L. Sp. Pl. 470. 1753.

Shrubs; leaves deciduous or somewhat persistent, entire or shallowly serrate; flowers white, large and showy.

Patoni gives the local name of one of the Durango species as "mirto." Many of the species which are natives of Asia and the United States are cultivated for their showy, often fragrant flowers. The native species, and perhaps some of the foreign ones, are grown in Mexican gardens. The usual English names for the plants are "syringa"[1] and "mock orange," the latter name probably given because of the sweet odor of the flowers in some species. *Philadelphus coronarius* L., an Old World species, has been reported from Mexican gardens, and may very likely be cultivated there. The name was applied by Sessé and Mociño[2] to a native species.

Petals acute; stamens about 15.....1. P. mearnsii.
Petals rounded or retuse at apex; stamens 25 to 60.
Styles and free portion of the ovary glabrous.
Leaves pilose on the upper surface with spreading hairs.
Style evident; bark of older stems yellowish.....2. P. pumilus.
Style nearly obsolete; bark of older stems dark gray. 3. P. serpyllifolius.
Leaves strigose on both surfaces.
Bark of the previous year's branches not exfoliating. 4. P. asperifolius.
Bark of the previous year's branches exfoliating.....5. P. madrensis.
Styles or free part of the ovary or both more or less hairy.
Inflorescence 1 to 3-flowered; petals more or less hairy.
Calyx strigose; petals without a reddish spot at base..6. P. mexicanus.
Calyx densely white-sericeous; petals sometimes with a reddish spot at base.....7. P. coulteri.

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[1] This name is also the Latin generic name of the lilac, *Syringa vulgaris* L., of the family Oleaceae.

[2] Pl. Nov. Hisp. 82. 1887.

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Inflorescence 5 to 13-flowered; petals glabrous or pubescent below along the costa.

Branchlets grayish-strigose; leaves more or less strigose on both sides. **8. P. karwinskyanus.**

Branchlets and leaves glabrous, or the leaves hairy along the veins. **9. P. affinis.**

1. **Philadelphus mearnsii** W. H. Evans; Small & Rydb. N. Amer. Fl. **22**: 174. 1905.

Known only from the type locality, on the boundary between Chihuahua and New Mexico.

Low shrub with exfoliating bark; leaves oblong, 1 cm. long or shorter, entire, acutish, strigose; petals 1 cm. long.

2. **Philadelphus pumilus** Rydb. N. Amer. Fl. **22**: 173. 1905.

Baja California. California; type from San Jacinto Mountains.

Shrub, 1.2 to 1.8 meters high; leaves oblong or elliptic, 6 to 10 mm. long, obtuse, white-sericeous beneath.

The species has been reported from Baja California as *P. serpyllifolius* A. Gray.

3. **Philadelphus serpyllifolius** A. Gray, Pl. Wright. **1**: 77. 1852.

Northern Chihuahua and Sonora. Western Texas (type locality) and southern New Mexico.

Shrub, 1 meter high or less, with spreading branches; leaves oblong or oval, 1 cm. long or shorter, entire.

4. **Philadelphus asperifolius** Koern.; Regel, Gartenflora **16**: 73. 1867.

Known only from the type locality, Hacienda Santiaguillo.

Shrub, 2 to 3 meters high; leaves oval or oval-ovate, 1 to 3 cm. long, obtuse or acutish.

5. **Philadelphus madrensis** Hemsl. Kew Bull. Misc. Inf. **1908**: 251. 1908.

Philadelphus palmeri Rydb. N. Amer. Fl. **22**: 173. 1905.

Philadelphus purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 270. 1918.

In the mountains, Durango to Nuevo León and San Luis Potosí; type from the Sierra Madre of Durango.

Erect shrub with slender gray or brown branches; leaves lanceolate to oval-ovate, 1 to 3 cm. long, acute or obtuse.

6. **Philadelphus mexicanus** Schlecht. Linnaea **13**: 418. 1839.

Veracruz to Morelos and Oaxaca; sometimes cultivated; type from Jalapa, Veracruz.

Shrub, sometimes scandent to a height of 6 meters; leaves lanceolate to broadly ovate, 3 to 7 cm. long, short-petiolate, acuminate, remotely denticulate; flowers showy, fragrant, cream-colored, 3 to 4 cm. broad. "Jazmín," "acuilotl" (Oaxaca); "jazmín del monte," "jeringuilla" (Valley of Mexico, *Cervantes*); "mosqueta."

This species has been introduced into cultivation in Europe. It or one of the related species is figured and described by Hernández[1] in a chapter entitled "De *Acuilotl*, seu Volubili Aquatica." His account is as follows: "*Acuilotl*, or water-vine, is so called by the Mexicans not without reason, for it grows in moist places, and spreads over the ground or climbs over near-by trees. There are two sorts, differing only in color of flowers, name, and size of leaves. The first has pure white flowers and slightly smaller leaves, and is called *Acuilotl;* in the second the flowers are pale and the leaves larger, and it is called *Cozticacuilotl*,

[1] Thesaurus 107. 1651.

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because of the yellow color of the flowers. The stems of both are round, purplish, woody, brittle, and slender, with soft pith. In form and odor the flowers are not unlike the musk rose, a plant not wholly different from this one. The leaves are like those of the bramble, but less toothed, with nerves running lengthwise, and with almost the odor of cucumber. The flowering branches are employed for their perfume by the Indians, and for the garlands which they use so much; and a scented water of pleasant odor is distilled from them. The plant grows in temperate or rather cold places. The leaves are bitter and dry and hot in almost the third order, wherefore, if taken in wine in the quantity of a handful, they relieve colic, and if crushed and applied as a plaster, they ease strained members, and dissolve tumors beyond belief." Hernández also gives an illustration,[1] without description, of the "cozticacuilotl xochitl."

7. **Philadelphus coulteri** S. Wats. Proc. Amer. Acad. **22**: 472. 1887.

Nuevo León to Hidalgo; type from Zimapán, Hidalgo.

Shrub, 1 to 3 meters high; leaves lanceolate or ovate, 3 to 5 cm. long, acute or acuminate, green above, white beneath, denticulate; flowers very fragrant, white, about 4.5 cm. broad, with a red or purple spot at the base of each petal.

8. **Philadelphus karwinskyanus** Koehne, Gartenflora **1896**: 486. 1896.

Veracruz and Oaxaca; type from Totolapa, Oaxaca.

Tall shrub; leaves ovate, 2 to 6 cm. long, acute or acuminate, denticulate or entire; petals about 1 cm. long.

9. **Philadelphus affinis** Schlecht. Linnaea **13**: 419. 1839.

Hidalgo, Veracruz, and Oaxaca; type from Hacienda del Carmen.

Shrub, sometimes 4 meters high; leaves lance-ovate to rounded-ovate, 3.5 to 7 cm. long, acuminate, green on both sides, remotely denticulate; flowers large and showy.

4. FENDLERELLA Heller, Bull. Torrey Club 25: 626. 1898.

Low, densely branched shrubs with exfoliating bark; leaves small, 3-nerved, entire, deciduous; flowers small, white, in small dense cymes.

Leaves green beneath, thinly strigose, not at all tomentose.....1. F. utahensis.
Leaves densely white-tomentose beneath.
Petals copiously pilose outside.....2. F. lasiopetala.
Petals glabrous.....3. F. mexicana.

1. **Fendlerella utahensis** (S. Wats.) Heller, Bull. Torrey Club **25**: 626. 1898.

Whipplea utahensis S. Wats. Amer. Nat. **7**: 300. 1873.

Fendlerella cymosa Greene; Woot. & Standl. Contr. U. S. Nat. Herb. **16**: 129. 1913.

Mountains of Chihuahua and Coahuila. Nevada to New Mexico; type from Utah.

Densely branched shrub, 1 meter high or less; leaves linear-oblong to elliptic, 0.5 to 2.5 cm. long, acute or obtuse.

2. **Fendlerella lasiopetala** Standl. Proc. Biol. Soc. Washington **33**: 67. 1920.

Known only from the type locality, San Lorenzo Canyon, southeast of Saltillo, Coahuila.

Leaves elliptic or oval-elliptic, 1.5 cm. long or shorter, acute or acutish.

3. **Fendlerella mexicana** T. S. Brandeg. Zoe **5**: 246. 1908.

Known only from the type locality, Cerro de Paxtle, Puebla.

Leaves elliptic or ovate, about 1 cm. long, with revolute margins.

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[1] Thesaurus 374. 1651.

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5. **FENDLERA**[1] Engelm. & Gray; A. Gray, Pl. Wright. 1: 77. 1852.

REFERENCE: Rehder, Journ. Arn. Arb. 1: 203–206. 1920.

Erect shrubs with striate branches; leaves small, deciduous, entire, 3-nerved, sessile or nearly so; flowers large, white, solitary or clustered.

Leaves linear, strongly revolute, glabrous or nearly so on the upper surface. 1. F. linearis.

Leaves narrowly lanceolate to ovate-oblong.

Leaves sparsely strigose or nearly glabrous beneath, glabrous above, not revolute 2. F. rupicola.

Leaves tomentose and strigose beneath, scabrous above, revolute. 3. F. wrightii.

1. **Fendlera linearis** Rehder, Journ. Arn. Arb. 1: 205. 1920.

Known only from the type locality, in the Sierra Madre near Monterrey, Nuevo León.

Leaves 1.5 to 2.5 cm. long, 1 to 1.5 mm. wide, strigose beneath; petals 7 to 8 mm. long; capsule about 8 mm. long.

2. **Fendlera rupicola** A. Gray, Pl. Wright. 1: 77. 1852.

Sonora. Western Texas and southern New Mexico; type from New Braunfels, Texas.

Shrub, 1 to 2 meters high; leaves oblong or elliptic, 1 to 4 cm. long; petals 1.5 to 2 cm. long.

3. **Fendlera wrightii** (A. Gray) Heller, Bull. Torrey Club 24: 537. 1897.

Fendlera rupicola wrightii A. Gray, Pl. Wright. 1: 77. 1852.

Chihuahua. Western Texas to Colorado and Arizona; type from San Pedro River, Texas.

Shrub, very similar to the preceding species; leaves 1 to 2 cm. long; petals usually only 1.2 to 1.5 cm. long.

53. PTEROSTEMONACEAE. Pterostemon Family.

1. **PTEROSTEMON** Schauer, Linnaea 20: 736. 1847.

Pubescent shrubs; leaves alternate, petiolate, dentate, the stipules minute or obsolete; flowers perfect, showy, white, cymose; fruit a capsule.

Calyx densely pilose with long stiff white hairs; leaf blades somewhat narrowed to the obtuse or broadly cuneate base 1. P. mexicanus.

Calyx puberulent or minutely pilose; leaf blades rounded or broadly rounded at base 2. P. rotundifolius.

1. **Pterostemon mexicanus** Schauer, Linnaea 20: 726. 1847.

Hidalgo; type from Zimapán.

Shrub with dark branches; leaves obovate-orbicular, 2 to 3 cm. long, densely pilose beneath; flowers about 1 cm. long.

2. **Pterostemon rotundifolius** Ramírez, Estudio 4: 453. *pl. 18.* 1893.

Puebla and Oaxaca; type from between Jaltepetongo and Guandulain, Oaxaca.

Shrub, 1.5 to 3 meters high; leaves suborbicular, 2 to 3 cm. long, soon glabrate beneath.

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[1] August Fendler (1813–1883), a native of Prussia, came to the United States in 1834. Later he visited Prussia, but soon returned to North America and settled in St. Louis, where he made the acquaintance of Engelmann. In 1847 he followed the Santa Fe Trail to New Mexico, where he made a large collection of plants, upon which a report was published by Gray. Later he botanized in Panama and Venezuela, where he obtained important collections, and finally settled in Trinidad, where he died.

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54. ESCALLONIACEAE. Escallonia Family.

1. PHYLLONOMA Willd.; Roem. & Schult. Syst. Veg. 6: 210. 1820.

REFERENCE: Rusby, N. Amer. Fl. 22: 191. 1905.

1. **Phyllonoma laticuspis** (Turcz.) Engl. in Engl. & Prantl, Pflanzenfam. 3 [2a]: 87. 1890.

Dulongia laticuspis Turcz. Bull. Soc. Nat. Moscou 31 [1]: 454. 1858.

Durango to Chiapas; type from Oaxaca.

Shrub or small tree with slender branches, glabrous; leaves alternate, estipulate, petiolate, lanceolate, 4 to 8 cm. long, long-acuminate, serrate; flowers very small, in small cymes borne upon the upper surface of the leaf; fruit small, baccate. "Hierba de la viruela" (Oaxaca).

The plant has a high reputation as a remedy for smallpox. This species has been reported from Mexico as *P. ruscifolia*.

55. GROSSULARIACEAE. Gooseberry Family.

REFERENCE: Coville & Britton, N. Amer. Fl. 22: 193-225. 1908.

Usually erect shrubs, spiny or unarmed; leaves alternate, petiolate, deciduous or persistent, lobed or toothed; flowers small, racemose, perfect; sepals and petals each 5; stamens 5, opposite the sepals; fruit a globose 1-celled berry, several or many-seeded.

The fruit of all the Mexican species is edible, but it varies greatly in quality.

Plants without spines; pedicels jointed below the ovary ..... 1. RIBES.
Plants with spines; pedicels not jointed ..... 2. GROSSULARIA.

1. RIBES L. Sp. Pl. 201. 1753.

Unarmed (in the Mexican species) shrubs; leaves palmately veined, usually lobed, commonly deciduous; racemes few to many-flowered; pedicel often bearing a pair of bractlets below the joint; fruit never spiny.

The best-known plant of the genus is *Ribes vulgare* Lam., the garden currant, which is cultivated for its sour red fruit. It is a native of Europe. The native American currants all have edible fruit which, however, is usually of sweetish and insipid flavor. The plants seem to be little used in medicine. A decoction of the roots of *R. americanum* Mill. is said to be employed by the Omaha and Winnebago Indians for renal and uterine affections.

Ovary with sessile glands; leaves not lobed, evergreen ..... 1. R. viburnifolium.
Ovary without glands or with stipitate glands; leaves lobed, deciduous.
  Anthers without a cup-shaped apical gland.
    Calyx tube glabrous, yellow, 3 or more times as long as thick.
      Flowers sessile or nearly so ..... 10. R. chihuahuense.
      Flowers pedicellate ..... 11. R. fontinale.
    Calyx tube pubescent, not yellow, or if so less than twice as long as thick.
      Axis of the raceme straight and stiff, 1 cm. long or shorter; leaves without glands ..... 12. R. tortuosum.
      Axis of the raceme flexuous, elongate; leaves usually with glands.
        Leaves with sessile scattered amber-colored waxlike glands on both surfaces ..... 13. R. nelsoni.
        Leaves with stipitate glands.
          Ovary glabrous ..... 14. R. brandegei.
          Ovary with gland-tipped hairs.
            Flowers pink or purple, 8 to 10 mm. long; pedicels 2 to 5 mm. long. 15. R. malvaceum.

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Flowers usually white or greenish white, 5 to 7 mm. long; pedicels 1 to 2 mm. long ..... 16. **R. indecorum.**

Anthers with a conspicuous cup-shaped apical gland.

Ovary with at least a few gland-tipped hairs, or the calyx more than 1 cm. long.

Leaves with sessile glands on both surfaces but without gland-tipped hairs; calyx and petals deep red ..... 2. **R. ceriferum.**

Leaves with gland-tipped hairs on both surfaces; flowers white or greenish white, sometimes partly purplish.

Sepals longer than the calyx tube, both together less than 7 mm. long. 3. **R. neglectum.**

Sepals shorter than the tube, both together 10 to 13 mm. long. 4. **R. pringlei.**

Ovary glabrous; calyx less than 1 cm. long.

Bracts obovate, dentate at the broad apex ..... 5. **R. dugesii.**

Bracts mostly linear-oblong to lanceolate, usually acute and entire.

Lobes of the calyx longer than the tube.

Leaves glabrous on the upper surface, the margin with gland-tipped hairs ..... 6. **R. orizabae.**

Leaves sparsely pubescent on the upper surface, the margin without gland-tipped hairs ..... 7. **R. affine.**

Lobes of the calyx equaling or shorter than the tube.

Leaves rounded, truncate, or cordate at base, the sinus shallow and open; glands of the leaves usually sessile; calyx 5 to 6 mm. long ..... 8. **R. rugosum.**

Leaves deeply cordate at base, the sinus usually closed, both surfaces, as well as the petioles, with stout gland-tipped hairs; calyx 8 to 10 mm. long ..... 9. **R. ciliatum.**

1. **Ribes viburnifolium** A. Gray, Proc. Amer. Acad. 17: 202. 1882.

Baja California; type from Todos Santos Bay. Southern California.

Shrub with straggling branches; leaves mostly oval or rounded-oval, 2 to 7 cm. long, bright green and lustrous on the upper surface, glabrous or nearly so; sepals pink, the petals greenish; racemes few-flowered, equaling or shorter than the leaves; fruit about 6 mm. in diameter.

2. **Ribes ceriferum** Coville & Rose, Contr. U. S. Nat. Herb. 8: 298. 1905.

Chihuahua and Durango; type from Mount Mohinora, Chihuahua.

Shrub, 1 to 4.5 meters high; leaves suborbicular, 2 to 5 cm. wide, 3-lobed, glabrous above or nearly so, puberulent beneath; flowers reddish; racemes 3 to 10-flowered, equaling or shorter than the leaves; pedicels 6 to 10 mm. long; fruit black, glabrous. "Capulincillo" (Durango).

3. **Ribes neglectum** Rose, Contr. U. S. Nat. Herb. 8: 298. 1905.

San Luis Potosí; type from Alvárez.

Shrub, 1.5 meters high or less; leaves 2 to 4 cm. wide, 3 or 5-lobed, glandular-pubescent; racemes 6 to 12-flowered, about as long as the leaves; pedicels 2 to 6 mm. long; fruit black, 8 to 10 mm. in diameter.

4. **Ribes pringlei** Rose, Contr. U. S. Nat. Herb. 8: 298. 1905.

State of Mexico and San Luis Potosí; type from Sierra de Ajusco.

Shrub, 1.8 to 3 meters high; leaves 3 to 7 cm. wide, 3 or 5-lobed, glandular-pubescent; flowers about 1.2 cm. long, pinkish; racemes drooping, 8 to 12-flowered, longer than the leaves; pedicels 6 to 8 mm. long; ovary glandular-pubescent.

5. **Ribes dugesii** Greenm. Proc. Amer. Acad. 39: 78. 1903.

Known only from the type locality, mountains of Santa Rosa, near Guanajuato.

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Leaves ovate-orbicular, 2 to 5 cm. wide, 3 or 5-lobed, sparsely glandular on both sides; sepals purplish, the petals white; fruit bluish black.

6. **Ribes orizabae** Rose, Contr. U. S. Nat. Herb. 8: 339. 1905.

Known only from the type locality, Orizaba, Veracruz.

Leaves broadly ovate or suborbicular, 3 or 5-lobed, glabrous above, glandular-pubescent beneath; racemes 8 to 12-flowered; pedicels 5 to 8 mm. long; ovary glabrous.

7. **Ribes affine** H. B. K. Nov. Gen. & Sp. 6: 60. 1823.

Ribes multiflorum H. B. K. Nov. Gen. & Sp. 6: 60. 1823. Not *R. multiflorum* Willd. 1813.

Ribes kunthii Berland. Mém. Soc. Phys. Hist. Nat. Genève 3[2]: 60. 1826.

Ribes mexicanum Spreng. Syst. Veg. 4: Cur. Post. 100. 1827.

Ribes altamirani Jancz. Bull. Acad. Cracovie 1906: 10. 1906.

Hidalgo and Querétaro; type from Morán, Hidalgo.

Shrub, 1 to 3 meters high; leaves 4.5 cm. wide or smaller, broadly ovate or orbicular, 3 or 5-lobed, pubescent; racemes pendulous, 6 to 12-flowered, shorter than the leaves; pedicels 5 to 8 mm. long; fruit bluish black, glabrous, 8 mm. in diameter.

8. **Ribes rugosum** Coville & Rose, Contr. U. S. Nat. Herb. 8: 300. 1905.

Ribes grande Rose, Contr. U. S. Nat. Herb. 8: 339. 1905.

Mexico and Puebla; type from Santa Fé, Valley of Mexico.

Shrub, 1.5 to 3.5 meters high; leaves 3 to 5 cm. wide, suborbicular, 3 or 5-lobed, glabrous above, pubescent beneath; flowers greenish or pinkish; racemes drooping, 7 to 12-flowered; pedicels 3 to 6 mm. long; fruit bluish black, glabrous. "Capulincillo," "ciruelillo" (Mexico, *Reiche*).

9. **Ribes ciliatum** Humb. & Bonpl.; Roem. & Schult. Syst. Veg. 5: 500. 1819.

Ribes jorullense H. B. K. Nov. Gen. & Sp. 6: 61. 1823.

High mountains, Colima to Oaxaca, and Veracruz.

Shrub, 3 to 5 meters high; leaves 3 to 9 cm. wide, suborbicular, 3 or 5-lobed, glabrous above, pubescent beneath; flowers greenish white, fragrant; racemes drooping, about 10-flowered; fruit glabrous, 8 mm. in diameter. "Capulincillo" (Valley of Mexico); "ciruelillo" (Mexico, Hidalgo); "saracuacho" (Mexico).

Roots reputed to have emetic properties.

10. **Ribes chihuahuense** Britton, Torreya 7: 102. 1907.

Known only from the type locality, near the city of Chihuahua.

Leaves 2 to 2.5 cm. long, ovate or suborbicular, glabrous, the lobes few-toothed; racemes 3 to 5-flowered, slightly longer than the leaves, the flowers sessile or nearly so.

11. **Ribes fontinale** Britton; Coville & Britton, N. Amer. Fl. 32: 205. 1908.

Known only from the type locality, Samalayuca, Chihuahua.

Leaves 3 cm. wide or smaller, usually 3-lobed, the lobes entire or few-toothed; racemes 4 to 7-flowered, 3 to 4 cm. long.

12. **Ribes tortuosum** Benth. Bot. Voy. Sulph. 17. 1844.

Ribes palmeri Vasey & Rose, Proc. U. S. Nat. Mus. 11: 529. 1889.

Baja California; type from San Quentín.

Shrub, 1.2 meters high or less, with short stiff branches; leaves 1.5 to 3 cm. wide, very shallowly 5-lobed, finely puberulent on both sides; fruit red, 6 to 8 mm. in diameter, glabrous.

13. **Ribes nelsoni** Coville & Rose, Contr. U. S. Nat. Herb. 8: 297. 1905.

Chihuahua; type from Colonia García.

Shrub, 1 to 2 meters high; leaves 6 cm. wide or smaller, with 3 or 5 acute lobes, serrate-dentate; flowers pale yellow; racemes drooping, 6 to 10-flowered.

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14. Ribes brandegei Eastw. Proc. Calif. Acad. III. **2**: 242. 1902.

Mountain slopes, Baja California; type from Sierra de Laguna.

Erect shrub, 2.5 meters high; leaves 3 to 5 cm. wide, 3-lobed, sparsely glandular-pubescent on both sides; sepals rose-purple, the petals white; racemes 3 to 10-flowered; fruit glabrous.

15. Ribes malvaceum Smith in Rees, Cycl. **30**: *Ribes* no. 13. 1815.

Northern Baja California. California.

Erect shrub; leaves shallowly 3 or 5-lobed, 2.5 to 5 cm. wide, tomentose and glandular-pubescent beneath; flowers pink or purple, the racemes longer than the leaves; fruit viscid-pubescent, 1 cm. or less in diameter.

16. Ribes indecorum Eastw. Proc. Calif. Acad. III. **2**: 243. 1902.

Mountains of Baja California, at an altitude of 840 to 900 meters. Southern California, the type collected near San Diego.

Shrub, 1.8 to 2.5 meters high, the young shoots glandular-pubescent; leaves reniform-orbicular, obtusely 3 or 5-lobed, 2 to 5 cm. wide, stipitate-glandular on the upper surface; ovary with simple and gland-tipped hairs; fruit about 7 mm. in diameter.

2. GROSSULARIA Mill. Gard. Dict. ed. 7. 1759.

Spiny erect shrubs; leaves deciduous, palmately veined; racemes few-flowered; bractlets, if present, minute, at the base of the pedicel; ovary sometimes spiny.

The cultivated gooseberry is *Grossularia reclinata* (L.) Mill., a native of northern Europe. The native American species have edible fruit, which is extremely sour until maturity, when it becomes sweet.

Lobes of the calyx twice as long as the tube or longer; petals red throughout. **1. G. madrensis.**

Lobes of the calyx less than twice as long as the tube; petals yellow or greenish, sometimes with purple margins.

Calyx 10 to 12 mm. long ---------- **2. G. microphylla.**

Calyx 5 to 6 mm. long ---------- **3. G. quercetorum.**

1. Grossularia madrensis Coville & Rose; Coville & Britton, N. Amer. Fl. **22**: 217. 1908.

Ribes madrense Coville & Rose, Smiths. Misc. Col. **50**: 32. 1907.

Known only from the type locality, Quebrada Honda, Durango.

Erect shrub with slender spines; leaves 3 cm. wide or less, 3 or 5-lobed, glandular-pubescent; peduncles 1 or 2-flowered; petals dark red; fruit glabrous.

2. Grossularia microphylla (H. B. K.) Coville & Britton, N. Amer. Fl. **22**: 219. 1908.

Ribes microphyllum H. B. K. Nov. Gen. & Sp. **6**: 62. 1823.

Veracruz to Michoacán; type from El Guarda.

Shrub, 1 to 3 meters high; leaves 2.5 cm. wide or smaller, 3 or 5-lobed, somewhat pubescent; flowers reddish yellow; fruit glabrous, 8 mm. in diameter.

3. Grossularia quercetorum (Greene) Coville & Britton, N. Amer. Fl. **22**: 220. 1908.

Ribes quercetorum Greene, Bull. Calif. Acad. **1**: 83. 1885.

Baja California. California; type from El Paso de Robles.

Shrub, 1 to 1.5 meters high; leaves 1 to 2 cm. wide, deeply lobed; fruit glabrous, 8 mm. in diameter.

56. CUNONIACEAE. Cunonia Family.

1. WEINMANNIA L. Syst. Nat. ed. 10. 1005. 1759.

REFERENCE: Britton, N. Amer. Fl. **22**: 179–180. 1905.

Weinmannia fagaroides H. B. K., of Ecuador, is said to furnish wood of good quality. Its bark is rich in tannin and is used for tanning leather. The species

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of Madagascar are large trees with durable wood. Their bark contains much tannin and yields a black dye.

1. **Weinmannia pinnata** L. Syst. Nat. ed. 10. 1005. 1759.

Weinmannia glabra L. f. Suppl. Pl. 228. 1781.

Weinmannia intermedia Schlecht. & Cham. Linnaea 5: 555. 1830.

Mountains of Hidalgo, Veracruz, and Oaxaca. West Indies, Central America, and South America; type from Jamaica.

Shrub or small tree, copiously pubescent; leaves opposite, stipulate, pinnate, the rachis winged, the leaflets 9 to 25, oval or oblong, 1 to 2 cm. long, crenate; flowers small, in long racemes; sepals 4 or 5; petals 4 or 5; stamens 8 or 10; fruit a small capsule. "Lorito" (Costa Rica); "oreganillo" (Porto Rico); "encinillo" (Colombia).

The bark is astringent, and a gum often exudes from it. It is said that the bark has been used as an adulterant of quinine.

57. HAMAMELIDACEAE. Witch-hazel Family.

1. LIQUIDAMBAR L. Sp. Pl. 999. 1753.

REFERENCE: P. Wilson, N. Amer. Fl. 22: 189. 1905.

The balsam derived from *Liquidambar orientalis* Mill., of western Asia, is the official Styrax of the U. S. Pharmacopoeia; it is known also as storax. It is used in medicine as a stimulating expectorant and very feeble germicide.

1. **Liquidambar styraciflua** L. Sp. Pl. 999. 1753.

Liquidambar macrophylla Oerst. Amér. Centr. 16. 1863.

Liquidambar styraciflua mexicana Oerst. Amér. Centr. 16. 1863.

Mountains, Veracruz and Puebla to Chiapas. Guatemala; eastern United States; type from Virginia.

Large or small tree, sometimes 45 meters high, with a trunk 1.5 meters in diameter, the crown broad or narrow; bark thick, deeply furrowed, grayish, the young branches usually with corky wings; leaves about 15 cm. wide, with 5 deep acute lobes, bright green; flowers unisexual, the staminate racemose, the pistillate in globose heads, the heads becoming spiny and conelike in fruit; perianth none; fruit a capsule, opening at the apex, containing few winged seeds; wood hard, weak, light brown, its specific gravity about 0.59. "Xochiquahuitl," "xochiocotzoquahuitl," "xochiocotzotl" (the gum) (Nahuatl); "maripenda" (Michoacán, Tarascan); "nabá" (Chiapas, *Morelet*); "ocotzotl," "ocozotl," or "ocozol" (Veracruz); "ocozote" (Oaxaca, *Reko*); "estoraque" (Oaxaca, Guatemala); "liquidámbar" (Oaxaca, Guatemala, Honduras, Nicaragua); "yaga-bito," "yaga-bizigui" (Oaxaca, Zapotec).

The wood of the sweet-gum takes a good polish but warps badly. It is used in the United States for furniture, shingles, paving blocks, etc., and in Mexico for boxes, chests, and other articles. For interior finish of houses it is very popular, for it is of fine appearance when polished. The leaves (which are beautifully colored in autumn, before falling) contain tannin.

The resin or balsam obtained from the tree appears to be little known in the United States, but in Mexico and Central America it has been much used from the earliest times. It has been employed also in Europe in medicine, under the names "liquidambar" and "copalm balsam." The balsam is a transparent yellowish liquid with peculiar agreeable balsamic odor and bitter warm acrid taste; upon exposure to the air it hardens. The gum is sometimes chewed in the southern United States to sweeten the breath. A sirup prepared from the bark has been used as a remedy for diarrhoea and dysentery, especially in children.

The method of gathering the balsam in Honduras, and the uses made of it there, are detailed in the following account by W. V. Wells:[1] "The owners

[1] Explorations and adventures in Honduras, pp. 321–322. 1857.

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of cattle estates send their mayordomos into the woods to collect the gum, which is found exuding from the pores of the tree, and often collecting, like that of the peach, in some knot or bruise along its smooth surface. The gum trickles from the incision in transparent tears down the conduits made by the natives, until, from a spout inserted in some convenient place, a pint or more is collected. By climbing to the lower branches a purer quality is said to be obtained.

"A rim of plantain leaves, bound tightly around the trunk and left for several days, is found filled with the precious distillation. I afterwards went with Julio, the mayordomo of Lepaguare, about two leagues to one of these trees, where he procured from the leafy troughs at least a pint. The trunk of the liquid amber-tree is clammy to the touch, so that numerous living bees, attracted by the sweet, glutinous substance sweating from the pores, are found sticking helplessly to the bark. The gum, when bottled, becomes of the consistency of sirup. In the *caballeria* of Don Francisco Zelaya there were at least two gallons used for no other purpose than to heal the wounds of horses, mules and cattle. * * * I was assured that it never failed to effect a speedy cure for flesh-wounds in horses, and that in the mountains, when the mahogany-cutters or hunters wounded themselves, they applied at once to this tree for *remedios*. It is sometimes mixed into a stiff gum with other substances, and chewed by the Indians as a preservative of the teeth."

One of the earliest references to the sweet-gum tree is that by Bernal Diaz del Castillo[1] who, describing the meals taken by the Mexican emperor, says: "After he had dined, they presented to him three little canes highly ornamented, containing liquid amber, mixed with an herb they call tobacco, and when he had sufficiently viewed and heard the singers, dancers, and buffoons, he took a little of the smoke of one of these canes." The balsam and gum were much used for flavoring tobacco and also as incense in houses and temples. As for medicinal uses, the tree was employed in catarrhal, stomachic, and other affections, and was reputed to have stimulant properties. The following account of the tree by Hernández,[2] accompanied by a figure, is given in a chapter entitled "De *Xochiocotzo Quahuitl*, seu Arbore Liquidambari Indici": "*Xochiocotzo Quahuitl* is a large tree, with leaves almost like those of a maple, divided into three points and two notches, toothed, on one side whitish and on the other darker. The bark of the trunk is partly yellow and partly green. It grows in plains and in hot, or sometimes in temperate places, like *Hoeyacocotla*, *Quahuchinac*, and *Xicotepec*. Its nature is hot and dry, and its odor pleasant. If the bark of this tree is cut, there flows from it what is called Indian Liquidambar by the Spaniards, and by the Mexicans *Xochiocotzol*, in the sweetness of its odor very like Styrax. Its nature is hot in the third order, and dry, and added to tobacco it strengthens the head, belly, and heart, induces sleep, and alleviates pains in the head that are caused by colds. Alone, it dissipates humors, relieves pains, and cures eruptions of the skin. From the same tree, either spontaneously or from incisions, there is distilled an oil, no whit inferior to the famed liquor, either in sweetness of odor or in medicinal virtues, albeit some assert that the oil is distilled from the first liquor, put in a suitable place, or expressed, so that the thinner part of it may distil; and they assert that it is hot and moist, not accurately, however.

[1] True history of the conquest of Mexico, translation by Keatinge, p. 140. 1800.

[2] Thesaurus 56. 1651. See also M. G. Lozada, El Liquidámbar, Naturaleza 1: 70.

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It relieves wind in the stomach and dissipates tumors beyond belief, it aids digestion, strengthens the belly, heals uterine affections, and others similar to those, either alone or mixed with other drugs. There are some who prepare a kind of balsam from the twigs steeped in water, but this is meaner and less suitable for the aforesaid remedies, and not fit for any except the meaner uses."

58. PLATANACEAE. Plane-tree Family.

REFERENCE: Gleason, N. Amer. Fl. 22: 227–229. 1908.

1. PLATANUS L. Sp. Pl. 999. 1753.

Large trees with thin peeling bark; pubescence of stellate hairs; leaves alternate, long-petiolate, palmately nerved, dentate or lobate, with large stipules; flowers small, green, unisexual, monoecious, in large dense globose heads; sepals 3 or 4; petals small, alternate with the sepals; stamens alternate with the petals; fruit of nutlets, each surrounded by stiff erect hairs.

The species of this genus are known by the English names of "buttonwood," "sycamore," and "plane-tree." They are excellent shade trees and especially to be recommended for street planting. They are little attacked by insects and usually have broad crowns, with tough branches not easily broken by the wind. The native species are planted as shade trees in Mexico.

Heads 1 or 2 or rarely 3 on each peduncle, sessile.
- Leaves whitish-tomentose beneath ..... 1. P. mexicana.
- Leaves green and glabrate beneath ..... 2. P. glabrata.

Heads 3 to 6 on each peduncle.
- Leaves with 5 deep narrow lobes, truncate or often deeply cordate at the base.
  - Heads slender-stalked; leaves rather closely grayish-tomentose at first but soon glabrate ..... 3. P. wrightii.
  - Heads sessile or on very short stalks; leaves loosely yellow-tomentose. ..... 4. P. racemosa.
- Leaves not lobed, or with 3 lobes, or rarely with 2 very small additional lobes, these often very shallow.
  - Heads stalked ..... 5. P. chiapensis.
  - Heads sessile.
    - Leaves rounded and conspicuously decurrent at base, loosely white-tomentose beneath the lobes usually entire ..... 6. P. lindeniana.
    - Leaves truncate or subcordate at base, scarcely or not at all decurrent, with a very close sparse tomentum beneath, not whitish, the lobes coarsely dentate ..... 7. P. oaxacana.

1. Platanus mexicana Moric. Pl. Amer. Rar. 12. 1830.

Along watercourses, Tamaulipas, Nuevo León, San Luis Potosí, and Veracruz.

Large tree, 15 to 20 meters high, the trunk 1.5 meters in diameter, with broad crown; leaves long-petiolate, 7 to 20 cm. wide, with 5 or more acuminate lobes; fruit heads brownish, about 3 cm. in diameter. "Aya" (Veracruz, *Schiede*); "álamo" (Tamaulipas, Veracruz); "álamo blanco" (San Luis Potosí, Nuevo León, Tamaulipas).

Sometimes planted as a shade tree. The wood is used for general carpenter work and for dishes and spoons.

2. Platanus glabrata Fernald, Proc. Amer. Acad. 36: 493. 1901.

Coahuila, Nuevo León, and San Luis Potosí; type from Monclova, Coahuila.

Leaves 5 to 20 cm. wide, usually green on both surfaces, acutely lobed and dentate. "Álamo" (San Luis Potosí).

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3. **Platanus wrightii** S. Wats. Proc. Amer. Acad. 10: 349. 1875.

Northern Chihuahua and Sonora; sometimes planted as a shade tree. Southern Arizona (type locality) and New Mexico.

Tree with broad crown, sometimes 24 meters high, with a trunk diameter of 1.5 meters, the bark brownish, scaling off in thin sheets; leaves 15 to 20 cm. wide, with 3 to 7 long narrow lobes, these entire or sparsely dentate; wood light brown, its specific gravity about 0.47.

4. **Platanus racemosa** Nutt. N. Amer. Sylv. 1: 47. 1842.

Baja California. California (type locality).

Large tree, sometimes 38 meters high, with a trunk diameter of 2.7 meters; leaves deeply lobed, 15 to 25 cm. wide; wood hard, coarse-grained, light brown, weak and not durable, its specific gravity about 0.49.

5. **Platanus chiapensis** Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

Chiapas; type from Zincantán.

Tree, 15 meters high; leaves with 3 short acute lobes, or merely coarsely and remotely dentate, 9 to 23 cm. long, fulvous-tomentose beneath.

6. **Platanus lindeniana** Mart. & Gal. Bull. Acad. Brux. 10[1]: 342. 1843.

Veracruz and Puebla to Chiapas; type from Jalapa.

Tree, 30 to 40 meters high; leaves 9 to 20 cm. long or larger, with 3 long narrow lobes. "Álamo" (Veracruz).

This may be the species reported from Uruapam by Sessé and Mociño[1] as *P. orientalis*. That name belongs to an Old World species.

7. **Platanus oaxacana** Standl. Contr. U. S. Nat. Herb. 20: 213. 1919.

Known only from the type locality, San Miguel Alborrados, Oaxaca, altitude 1,950 meters.

Leaves 12 to 20 cm. wide.

59. CROSSOSOMATACEAE. Crossosoma Family.

REFERENCE: Small, N. Amer. Fl. 22: 231–232. 1908.

1. CROSSOSOMA Nutt. Journ. Acad. Phila. II. 1: 150. 1848.

Shrubs or small trees with rough astringent bark; leaves alternate, thick, small, entire; flowers perfect, solitary, white or purplish; sepals and petals 5 each; stamens usually 15 or more; fruit a cluster of 2 to 5 follicles.

Petals broadly obovate or orbicular-obovate; follicles many-seeded. 1. C. californicum.

Petals spatulate or oblong; follicles few-seeded.

Body of the follicle oblong-cylindric, rugose ..... 2. C. bigelovii.

Body of the follicle ovoid, reticulate ..... 3. C. parviflorum.

1. **Crossosoma californicum** Nutt. Journ. Acad. Phila. II. 1: 150. 1848.

Guadalupe Island, Baja California. Islands off the coast of southern California; type from Santa Catalina Island.

Shrub or small tree with rough scaly bark; leaves oblong, obovate, or spatulate, 2.5 to 9 cm. long, sessile or nearly so; petals white, 1.5 to 1.8 cm. long.

2. **Crossosoma bigelovii**[2] S. Wats. Proc. Amer. Acad. 11: 122. 1876.

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[1] Pl. Nov. Hisp. 163. 1887.

[2] John Milton Bigelow (1804–1878) was appointed in 1850 surgeon of the Mexican Boundary Commission, and in 1853 surgeon and botanist of the expedition under Lieutenant Whipple, which explored the route for a railroad along the thirty-fifth parallel. He made large collections of plants, which were reported upon by Torrey and Gray.

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Erect shrub, the branches sometimes spinelike; leaves 0.5 to 1.5 cm. long; petals white or purplish, 1 to 1.4 cm. long.

3. **Crossosoma parviflorum** Robins. & Fern. Proc. Amer. Acad. 30: 114. 1894.

Sonora. Arizona, the type from the Grand Canyon.

Shrub, 1 to 2.5 meters high; leaves elliptic-oblong, 8 to 13 mm. long, pale green; petals white, 6 mm. long.

60. ROSACEAE. Rose Family.

REFERENCE: Rydberg, N. Amer. Fl. 22: 239–533. 1908–1918.

Shrubs or trees; leaves usually alternate, simple or compound, commonly stipulate; flowers usually perfect, often large and showy; sepals normally 5; petals as many as the sepals or wanting; stamens usually numerous; fruit of achenes, follicles, or small drupes.

Many herbaceous plants of the family are natives of Mexico.

Leaves compound or deeply lobed and with linear lobes.
- Petals none; flowers in long spikelike racemes. Leaves pinnate, with 9 to 19 leaflets; very low shrub ..... 5. ACAENA.
- Petals present; flowers never in spikelike racemes.
  - Leaves 2 or 3 times pinnate, with very numerous minute divisions. Plants unarmed; flowers small, white, corymbose-paniculate. 9. CHAMAEBATIA.
  - Leaves once pinnate or digitate or merely lobed.
    - Leaves merely pinnate-lobed; flowers mostly solitary; plants unarmed.
      - Bractlets present on the calyx; pistils numerous ..... 7. FALLUGIA.
      - Bractlets none; pistils few ..... 8. COWANIA.
    - Leaves pinnate or digitate; flowers often racemose, corymbose, or paniculate; plants usually armed with spines.
      - Fruit of numerous druplets borne on a receptacle; leaves often palmate; petals usually white; stipules free from the petiole. 11. RUBUS.
      - Fruit globose or urceolate, with numerous achenes inside; leaves pinnate; petals pink or red; stipules united to the petiole. 12. ROSA.

Leaves simple, entire or dentate, or with short, broad lobes.
- Leaves entire. Flowers white.
  - Fruit of usually 3 follicles; leaves flat; flowers racemose ..... 1. SPIRAEA.
  - Fruit an achene; leaves clavate or filiform; flowers paniculate. 6. ADENOSTOMA.
- Leaves toothed or lobed.
  - Leaves digitately lobed; fruit of numerous fleshy druplets. Flowers large, white ..... 11. RUBUS.
  - Leaves merely dentate or crenate or pinnately lobed; fruit dry.
    - Petals none; calyx tube long-tubular; fruit a single achene with a long plumose tail; flowers axillary, solitary or fasciculate. 10. CERCOCARPUS.
    - Petals present; calyx tube never tubular; fruit of follicles or of more than one achene; flowers terminal, often paniculate.
      - Fruit of achenes with long plumose tails; flowers ochroleucous or purple ..... 8. COWANIA.
      - Fruit of follicles without long plumose tails; flowers white.
        - Stipules none; seeds exalate; leaves deciduous ..... 4. SERICOTHECA.
        - Stipules present, deciduous; seeds winged; leaves persistent.

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Carpels wholly united into a 5-celled capsule; flowers solitary or in small clusters ..... 2. **LINDLEYELLA.**

Carpels free above, wholly distinct at maturity; flowers corymbose. 3. **VAUQUELINIA.**

1. SPIRAEA L. Sp. Pl. 489. 1753.

Many of the species of this genus, especially those of Asiatic origin, are cultivated for ornament, and some are grown in Mexican gardens.

1. **Spiraea hartwegiana** Rydb. N. Amer. Fl. **22**: 246. 1908.

Spiraea parvifolia Benth. Pl. Hartw. 36. 1840. Not *S. parvifolia* Raf. 1838.

Puebla and Oaxaca; type from "Puenta del Dio."

Shrub with grayish or reddish brown branches; leaves spatulate, 7 to 15 mm. long, entire, glabrous; flowers small, white, racemose; petals 5, 2 mm. long; fruit of 5 follicles.

2. LINDLEYELLA Rydb. N. Amer. Fl. 22: 259. 1908.

1. **Lindleyella mespiloides** (H. B. K.) Rydb. N. Amer. Fl. **22**: 259. 1908.

Lindleya mespiloides H. B. K. Nov. Gen. & Sp. **6**: 240. 1823.

Lindleyella schiedeana Rydb. N. Amer. Fl. **22**: 259. 1908.

Coahuila to Tamaulipas and Oaxaca; type from between La Puente de la Madre de Dios and Magdalena.

Shrub, 2 to 3 meters high; leaves oblanceolate to broadly obovate, 1 to 4 cm. long, short-petiolate, glabrous, crenulate; flowers solitary or clustered, white, 2 to 3 cm. broad; petals 5; stamens 15 to 25. "Barreta" (Zacatecas).

3. VAUQUELINIA Correa; Humb. & Bonpl. Pl. Aequin. 1: 140. 1808.

Shrubs or small trees; leaves coriaceous, serrate or dentate, the stipules small, deciduous; flowers small, white, corymbose; petals 5; stamens 15 to 25; fruit a woody capsule.

Leaves finely tomentose beneath.

Leaf blades lanceolate or narrowly lanceolate, tapering to the apex, white beneath ..... 1. **V. californica.**

Leaf blades narrowly oblong, not tapering to the apex, obtuse, greenish beneath ..... 2. **V. australis.**

Leaves glabrous beneath, at least when fully expanded.

Leaf blades linear or linear-lanceolate, coarsely salient-dentate, acute or attenuate at base ..... 3. **V. corymbosa.**

Leaf blades lanceolate, oblong, broadly oblong, or ovate, truncate to acutish at base.

Leaf blades 3 to 5 cm. long, 0.6 to 1.1 cm. wide, finely serrulate; petioles 3 to 6 mm. long; inflorescence few-flowered ..... 4. **V. pauciflora.**

Leaf blades 5.5 to 10.5 cm. long, 1.3 to 3 cm. wide, coarsely serrate; petioles 6 to 25 mm. long; inflorescence many-flowered.

Leaf blades 3 to 5 times as long as broad, obtuse or acutish at base. 5. **V. karwinskyi.**

Leaf blades about twice as long as broad, truncate or very obtuse at base. 6. **V. latifolia.**

1. **Vauquelinia californica** (Torr.) Sarg. Gard. & For. **2**: 400. 1889.

Spiraea californica Torr. in Emory, Notes Mil. Reconn. 140. 1848.

Vauquelinia torreyi S. Wats. Proc. Amer. Acad. **11**: 147. 1876.

Reported from Sonora and Baja California. Arizona; type from mountains near the Gila.

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Shrub or small tree, up to 6 meters high, the trunk sometimes 18 cm. in diameter, the branches stiff and crooked; bark thin, reddish brown, scaly; leaves 4 to 8 cm. long; corymbs 5 to 8 cm. wide; wood hard, close-grained, dark brown, its specific gravity about 1.13.

2. **Vauquelinia australis** Standl. Proc. Biol. Soc. Washington 31: 132. 1918.

Known only from the type locality, Cerro de Paxtle, Puebla.

Leaves 3.5 to 6 cm. long, serrulate, lustrous on the upper surface; corymbs about 4 cm. broad; petals 3.5 mm. long.

3. **Vauquelinia corymbosa** Correa; Humb. & Bonpl. Pl. Aequin. 1: 140. 1808.

Vauquelinia angustifolia Rydb. N. Amer. Fl. 22: 260. 1908.

Chihuahua and Coahuila to Hidalgo; type from Actopan, Hidalgo. Western Texas.

Tree, up to 10 meters high; with brown bark; leaves 5 to 10 cm. long or larger, long-petiolate. "Guauyul," "guayule," "palo prieto," "árbol prieto," "palo verde" (Durango, *Patoni*).

The wood or bark is said to be used for dyeing goat skins yellow. Patoni states that the name "guayule" belongs properly to this plant rather than to *Parthenium argentatum*, to which it is now generally applied, and that it is doubtful how it came to be applied to the latter plant. *V. angustifolia* differs from the typical form in having less salient teeth, but the two forms are connected by specimens intermediate in character.

4. **Vauquelinia pauciflora** Standl. Proc. Biol. Soc. Washington 31: 132. 1918.

Known only from the type locality, Guadalupe Canyon, northeastern Sonora.

Tree; branches dark gray, leafy at the tips; leaves lustrous on the upper surface.

Rydberg has applied the name *V. torreyi* S. Wats. to this species, but that is evidently only a new name for *Spiraea californica* Torr. It may be that *V. pauciflora* is only a form of *V. californica*.

5. **Vauquelinia karwinskyi** Maxim. Act. Hort. Petrop. 6: 236. 1879.

Vauquelinia potosina Painter; Standl. Proc. Biol. Soc. Washington 31: 131. 1918.

San Luis Potosí and probably elsewhere; type from Santiaguillo.

Shrub or small tree with dark brown branches; leaves long-petiolate, lustrous on the upper surface.

6. **Vauquelinia latifolia** Rydb., sp. nov.

Coahuila and Tamaulipas; type from mountains near Miquihuana, Tamaulipas, altitude 2,100 to 2,700 meters. (*Nelson* 4481; U. S. Nat. Herb. no. 332669).

Shrub, 1 to 2.5 meters high; leaves petiolate, ovate to ovate-oblong, 5 to 6.5 cm. long, 2.5 to 3 cm. wide, obtuse or acute, rounded at base, coarsely serrate, thick-coriaceous, glabrous, lustrous, often glaucescent beneath; corymbs many-flowered, dense, glabrous, 4 to 5 cm. broad, the flowers about 6 mm. long.

4. SERICOTHECA Raf. Sylva Tell. 152. 1839.

Small or large shrubs; leaves estipulate, dentate; flowers small, white, paniculate, the panicles often large and showy; petals 5; stamens about 20; fruit of 5 small follicles.

Teeth of the leaves lanceolate or triangular-ovate, ending in a long mucro; stamens shorter than the calyx lobes.

Leaves glabrous on the upper surface ..... 4. S. fissa.

Leaves velvety-pubescent on the upper surface ..... 5. S. velutina.

Teeth of the leaves rounded or rounded-ovate, with a short mucro; stamens usually equaling the calyx lobes.

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Leaves glandular-atomiferous and slightly hairy on the veins beneath, not at all tomentose ..... 3. S. schaffneri.

Leaves tomentose and villous beneath.

Leaf blades abruptly contracted at the base, scarcely decurrent. 1. S. pachydisca.

Leaf blades cuneate at the base and decurrent on the winged petioles. 2. S. dumosa.

1. **Sericotheca pachydisca** Rydb. N. Amer. Fl. **22**: 263. 1908.

Known only from the type locality, Tacubaya, Valley of Mexico.

Shrub with brown branches; leaves 2 to 3 cm. long, short-petiolate, with few coarse teeth; panicles 10 to 15 cm. long.

2. **Sericotheca dumosa** (Nutt.) Rydb. N. Amer. Fl. **22**: 263. 1908.

Spiraea dumosa Nutt.; Hook. Lond. Journ. Bot. **6**: 217. 1847.

Holodiscus dumosus Heller, Cat. N. Amer. Pl. 4. 1898.

Chihuahua and Baja California. Northward to Wyoming; type from the Platte River.

Shrub, 1 to 2 meters high, often forming large clumps; leaves 2 to 5 cm. long, obtuse or acute; panicles 5 to 20 cm. long, very showy.

The fruit of this and other species is said to have been eaten by the Coahuilla Indians of California and the Tewa of New Mexico.

3. **Sericotheca schaffneri** Rydb. N. Amer. Fl. **22**: 264. 1908.

Northern Mexico; type from San Luis Potosí. Arizona.

Low shrub; leaves 1 to 3 cm. long, ovate or rounded-oval, obtuse; panicles 5 to 7 cm. long.

4. **Sericotheca fissa** (Lindl.) Rydb. N. Amer. Fl. **22**: 265. 1908.

Spiraea fissa Lindl. Bot. Reg. **26**: Misc. 73. 1840.

Spiraea argentea Benth. Pl. Hartw. 82. 1841. Not *S. argentea* L. f. 1781.

? *Holodiscus loeseneri* Dammer, Repert. Sp. Nov. Fedde **15**: 385. 1919.

Michoacán to Oaxaca and Veracruz. Guatemala to Costa Rica.

Shrub, 2.5 to 3.5 meters high; leaves 2 to 5 cm. long, acute; panicles 5 to 15 cm. long.

On the Pico de Orizaba the species ascends to 3,300 meters.

5. **Sericothea velutina** Rydb. N. Amer. Fl. **22**: 265. 1908.

Southern Mexico; type from Sierra de San Felipe, Oaxaca. Guatemala.

Shrub, 1 meter high or more; leaves 1.5 to 3 cm. long; panicles 5 to 10 cm. long.

DOUBTFUL SPECIES.

SPIRAEA MEXICANA Schiede; Regel, Ind. Sem. Hort. Petrop. **1857**: 58. 1858. Described from cultivated plants of Mexican origin.

5. ACAENA Mutis; L. Mant. Pl. 145. 1775.

Low shrubs, or often herbaceous almost throughout; leaves pinnate, stipulate; flowers small, spicate or racemose, the calyx covered with barbed prickles; petals none; stamens 3 to 5; fruit a solitary achene.

Upper leaflets 1.5 to 2 cm. long, the lower gradually reduced. 1. A. agrimonioides.

Upper leaflets 0.8 to 1.5 cm. long, the lower scarcely reduced ..... 2. A. elongata.

1. **Acaena agrimonioides** H. B. K. Nov. Gen. & Sp. **6**: 231. 1823.

Known only from the type locality, near Tianguillo.

Stems purplish; leaflets 9 to 13, sessile, acute, coarsely serrate.

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2. **Acaena elongata** L. Mant. Pl. 200. 1771.

Mountains, Veracruz to Mexico and Colima. Southward to Colombia.

Low shrub with brownish or purplish bark; leaflets 9 to 19, oval or elliptic, serrate, glabrous and lustrous on the upper surface; stamens purple; fruit covered with barbed spines.

6. ADENOSTOMA Hook. & Arn. Bot. Beechey Voy. 129. 1832.

Erect shrubs; leaves often fasciculate, filiform or clavate; flowers very small, white, paniculate; petals 5; stamens 10 to 15; fruit a single achene.

Leaves clavate, fascicled; bracts not scarious; stamens usually 15. **1. A. fasciculatum.**

Leaves filiform, scattered; bracts with scarious margins; stamens usually 10. **2. A. sparsifolium.**

1. **Adenostoma fasciculatum** Hook. & Arn. Bot. Beechey Voy. 139. 1832.

Adenostoma brevifolium Nutt.; Rydb. N. Amer. Fl. **22**: 396. 1913.

Baja California, abundant in the mountains at 300 to 1,800 meters. California; type from Monterey Bay.

Shrub, 0.5 to 6 meters high, the branches brown or gray; leaves 4 to 10 mm. long, acute or obtuse, lustrous; petals about 1.5 mm. long. "Chamiso" (Baja California).

2. **Adenostoma sparsifolium** Torr. in Emory, Notes Mil. Reconn. 140. 1848.

Baja California, on mountain slopes at 1,000 to 1,750 meters. California; type from Warner Pass.

Shrub or tree, 1 to 10 meters high, forming dense thickets, the branchlets green, the bark of old branches reddish brown, often peeling in thin sheets; leaves 5 to 12 mm. long, gland-dotted; flowers sometimes pinkish. "Palo amarillo" (Baja California); "hierba del pasmo," "chamiso" (California).

Often known in California as "greasewood." A decoction of the plant is used locally for chills and fevers and as a tonic. The Coahuilla Indians of California employed the wood for arrow points and rabbit sticks; a decoction of the twigs as a purgative and vomitive in the case of pains in the stomach and intestines; the powdered twigs mixed with grease as a salve; and a decoction of the plant as a remedy for sick cattle.

7. FALLUGIA Endl. Gen. Pl. 1246. 1840.

1. **Fallugia paradoxa** (D. Don) Endl.; Torr. in Emory, Notes Mil. Reconn. 140. 1848.

Sieversia paradoxa D. Don, Trans. Linn. Soc. Bot. **14**: 576. 1825.

Geum cercocarpoides DC.; Seringe in DC. Prodr. **2**: 554. 1825.

Fallugia mexicana Walp. Repert. Bot. **2**: 46. 1843.

Chihuahua, Durango, and Coahuila. Western Texas to Utah and Arizona.

Shrub, 1 to 2 meters high, the bark whitish, shredded; leaves 1 to 2 cm. long, divided into 3 to 7 linear revolute lobes; flowers white, usually solitary, long-pedunculate, the 5 petals 1.5 to 2 cm. long; stamens numerous; achenes with feathery purplish tails 3 to 5 cm. long. "Poñil" (New Mexico).

A very handsome shrub when in either flower or fruit; of some value as a forage plant. It is sometimes known in the southwestern United States as "Apache-plume." The Tewa Indians of New Mexico employed the smaller branches, tied in bundles, as brooms, and the larger ones for arrow shafts. They also, like the Hopi of Arizona, employed an infusion of the leaves for washing the hair to promote its growth, probably, according to Hough, because of the hairy fruit.

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8. COWANIA D. Don, Trans. Linn. Soc. Bot. 14: 574. 1825.

Erect shrubs or small trees; leaves dentate, pinnatifid, or entire, coriaceous, viscid, gland-dotted, the margins usually revolute; flower solitary; petals 5; stamens numerous; achenes 1 to 12, each with a long feathery tail.

Leaves entire ..... 1. C. ericaefolia.
Leaves dentate or pinnatifid.
Petals purple or rose; leaves 5 to 9-dentate; sepals cuspidate-acuminate. 2. C. plicata.
Petals white or yellowish; leaves 3 or 5-cleft; sepals rounded at apex.
Calyx tube campanulate, abruptly contracted at base; lobes of the leaves entire ..... 3. C. mexicana.
Calyx tube funnelform, gradually narrowed at base; lobes of the leaves cleft or dentate ..... 4. C. stansburiana.

1. **Cowania ericaefolia** Torr.; A. Gray, Pl. Wright. 2: 106. 1853.

Western Texas; type collected on rocks along the Rio Grande below Presidio del Norte; doubtless also in Chihuahua, although no Mexican specimens have been seen.

Shrub, 1 meter high or less, with dark brown bark; leaves linear-subulate, 4 to 6 mm. long; petals white or yellowish, 6 to 8 mm. long.

2. **Cowania plicata** D. Don; Sweet, Brit. Flower Gard. II. *pl. 400.* 1838.

Cowania purpurea Zucc. Abh. Akad. Wiss. München 4[2]: 7. 1845.

Greggia rupestris Engelm. in Wisliz. Mem. North. Mex. 114. 1848.

Rocky hillsides, Coahuila, San Luis Potosí, Zacatecas, and Guanajuato.

Shrub, 0.5 to 2 meters high, with shredded bark; leaves obovate, 6 to 20 mm. long, white-tomentose beneath; petals 10 to 12 mm. long.

3. **Cowania mexicana** D. Don, Trans. Linn. Soc. Bot. 14: 575. 1825.

Geum dryadoides DC.; Seringe in DC. Prodr. 2: 554. 1825.

Durango and Guanajuato; reported from Jalisco.

Shrub, 1 to 2 meters high, with brownish bark; leaves usually 3-cleft, 5 to 10 mm. long; petals cream-colored, about 8 mm. long. "Romero cedro" (Guanajuato, Jalisco); "chivatillo" (Durango, *Patoni*); "romerillo cimarrón" (*Seemann*).

4. **Cowania stansburiana** Torr. in Stansb. Expl. Great Salt Lake 386. 1852.

Dry hillsides, Chihuahua and Sonora. Colorado to southern California; type from Great Salt Lake, Utah.

Shrub, 1 to 3.5 meters high, with gray shredded bark; leaves 8 to 15 mm. long, viscid; petals white or pale yellow, 8 to 10 mm. long; tails of the fruit 4 to 5 cm. long.

Before the advent of European races the Indians of Utah and Nevada obtained material for clothing from this shrub. The thin, silky inner bark was removed in strips and woven or braided together. The bark was used also for sandals, ropes, and mats. The Gosiute Indians are said to have used the plant medicinally, but in what manner is not stated.

9. CHAMAEBATIA Benth. Pl. Hartw. 308. 1848.

1. **Chamaebatia australis** (T. S. Brandeg.) Abrams, Bull. Torrey Club 34: 263. 1907.

Chamaebatia foliolosa australis T. S. Brandeg. Bot. Gaz. 27: 447. 1899.

Northern Baja California; type from La Grulla. Southern California.

Low shrub, glandular-pubescent, with blackish branches; leaves 3 to 6 cm. long, 2 or 3 times pinnatifid into very numerous minute segments; flowers white, cymose-paniculate, the 5 petals 4 to 5 mm. long; stamens numerous.

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10. CERCOCARPUS H. B. K. Nov. Gen. & Sp. 6: 232. 1823.

Shrubs or small trees, leaves entire or dentate, thick; flowers axillary, solitary or fasciculate, inconspicuous; fruit with long feathery tails.

Patoni gives the vernacular name of a Durango species as "lentisco." Because of their very hard, tough wood the plants are commonly known in the United States by the name of "mountain mahogany." The wood of *C. ledifolius* Nutt. was used by the Gosiute Indians of Utah for bows. The Tewa of New-Mexico drink an infusion of the leaves of *C. montanus* Raf. (known as "palo duro") with salt, as a laxative.

Leaves coriaceous, the veins very prominent beneath, impressed above.
- Leaves crenate ..... 4. C. pringlei.
- Leaves serrate or dentate.
  - Leaf blades oval or elliptic, acute or subobtuse at the apex, the lateral veins mostly 12 to 20 on each side ..... 1. C. macrophyllus.
  - Leaf blades obovate to orbicular, rounded at apex, the lateral veins 5 to 10 on each side.
    - Leaves not conspicuously white-tomentose beneath, the lateral veins 7 to 10 on each side ..... 2. C. fothergilloides.
    - Leaves conspicuously white-tomentose beneath, the lateral veins 5 to 8 on each side ..... 3. C. mojadensis.

Leaves not coriaceous, the veins neither very prominent nor impressed.
- Leaf blades 2 to 6 cm. long, dentate at least at and above the middle.
  - Pubescence of the hypanthium and young leaves spreading. 5. C. rotundifolius.
  - Pubescence of the hypanthium and young leaves appressed. 6. C. betuloides.
- Leaf blades usually less than 2 cm. long, dentate only at the apex or entire.
  - Pubescence of the hypanthium and young leaves appressed; hypanthium tube less than 6 mm. long ..... 9. C. breviflorus.
  - Pubescence of the hypanthium and young leaves spreading; hypanthium tube 6 to 7 mm. long.
    - Pubescence of short hairs ..... 7. C. eximius.
    - Pubescence of long, shaggy hairs ..... 8. C. paucidentatus.

1. Cercocarpus macrophyllus C. Schneid. Handb. Laubh. 1: 530. 1905.

In the mountains, Jalisco to Veracruz and Guerrero; type from Orizaba, Veracruz.

Shrub, 2 to 4 meters high; leaves 4 to 11 cm. long, very thick, green above, tomentose beneath, dentate; tails of the fruit 5 to 6 cm. long.

2. Cercocarpus fothergilloides H. B. K. Nov. Gen. & Sp. 6: 233. 1823.

Mexico and Puebla; probably extending to Oaxaca; type from near the City of Mexico.

Shrub or small tree, 1 to 5 meters high; leaves 2.5 to 4.5 cm. long, dentate, lustrous on the upper surface. "Ramón," "zunu-iña" (Oaxaca).

3. Cercocarpus mojadensis C. Schneid. Handb. Laubh. 1: 530. 1905.

Coahuila and Zacatecas; type from Sierra Mojada, Coahuila.

Shrub or small tree; leaves 2 to 4 cm. long, dentate, white-tomentose beneath; tails of the fruit 3 to 4 cm. long.

4. Cercocarpus pringlei (C. Schneid.) Rydb. N. Amer. Fl. 22: 420. 1913.

Cercocarpus mojadensis pringlei C. Schneid. Mitt. Deutsch. Dendr. Ges. 14: 126. 1905.

Oaxaca; type from La Hoya Canyon.

Tree, up to 8 meters high; leaves 3 to 6.5 cm. long, white-tomentose beneath.

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5. **Cercocarpus rotundifolius** Rydb. N. Amer. Fl. **22**: 421. 1913.

Baja California; common in canyons at 1,440 to 1,700 meters. Southern California; type from Los Angeles County.

Shrub, 3 to 5.5 meters high, with dark branches, sometimes forming dense thickets; leaves rounded-oval or suborbicular, 1 to 3 cm. long; tails of the fruit 6 to 7 cm. long.

6. **Cercocarpus betuloides** Nutt.; Torr. & Gray, Fl. N. Amer. 1: 427. 1840.

Northern Baja California. California; type from Santa Barbara.

Shrub or tree, 3 to 10 meters high, the trunk sometimes 25 cm. in diameter; bark thin, separating into irregular scales; leaves oval or obovate, 1.5 to 5 cm. long; wood close-grained, reddish brown, its specific gravity about 0.93.

The wood is sometimes used for tool handles, and is useful for fuel.

7. **Cercocarpus eximius** (C. Schneid.) Rydb. N. Amer. Fl. **22**: 422. 1913.

Cercocarpus breviflorus eximius C. Schneid. Handb. Laubh. 1: 530. 1905.

Dry rocky hillsides, Chihuahua and Sonora. Arizona and New Mexico; type from Capitan Mountains, New Mexico.

Shrub or small tree, 1 to 7 meters high, the trunk sometimes 20 cm. in diameter, with very hard wood; bark thin, scaly; leaves obovate or elliptic, rounded at the apex; tails of the fruit 4 to 5 cm. long.

8. **Cercocarpus paucidentatus** (S. Wats.) Britton, Trans. N. Y. Acad. **14**: 31. 1894.

Cercocarpus parvifolius paucidentatus S. Wats. Proc. Amer. Acad. **17**: 353. 1882.

Cercocarpus treleasei C. Schneid. Handb. Laubh. 1: 530. 1905.

San Luis Potosí to Hidalgo; type from San Miguelito, San Luis Potosí.

Shrub with gray bark; leaves 5 to 10 mm. long; tails of the fruit about 3 cm. long.

9. **Cercocarpus breviflorus** A. Gray, Pl. Wright. **2**: 54. 1853.

Chihuahua, Coahuila, and Sonora; type from Fronteras, Sonora. Arizona to western Texas.

Shrub, 1 to 2 meters high, with dark gray, fissured bark; leaves elliptic, acute, 8 to 15 mm. long.

11. RUBUS L. Sp. Pl. 492. 1753.

Erect, prostrate, or scandent shrubs, usually armed with prickles or bristles; leaves persistent or deciduous, petiolate, simple or palmately or pinnately compound; flowers usually racemose or paniculate, large and showy; fruit of numerous small juicy drupes, these united and falling off like a cap or sometimes united to the receptacle, rarely falling off separately.

The genus contains the cultivated blackberries ("zarzamoras"), dewberries, and raspberries ("frambuesas"), some of which are grown in Mexico, although not very extensively. The native species are known in Mexico as "zarzamora"; the Tarascan name is said to be "situni"; the name "coatlamitl"[1] is reported from the Valley of Mexico. The fruit of all the native species is edible, and is used extensively in Mexico.

The root bark of the wild blackberries is official in the U. S. Pharmacopoeia. The decoction has long been a favorite domestic astringent remedy for diarrhoea.

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[1] The name should probably be "coatlantli" ("serpent's tooth"). The Nahuatl name for the fruit is "coatlanxocotl."

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Sessé and Mociño report[1] from Mexico *Rubus occidentalis* and *R. hispidus*, both United States species, *R. fruticosus*, a European species, and *R. pentha-phyllus*. The descriptions given are too brief for identification.

The tropical American species of *Rubus* seem to have attracted little attention from the early writers, but they are mentioned by Oviedo (Lib. VIII, Cap. XXVI), who says of the "zarzamoras:" "Although these can not be counted as trees in Spain, they are so here, where they have thicker trunks and stems and are much taller than in Castile, and for their size must be termed trees."

Leaves simple. Plants unarmed.
  Flowers paniculate; drupelets capped by a hard pubescent cushion.
    26. R. parviflorus.
  Flowers mostly solitary; drupelets without a cushion.
    Leaves concolorous, the terminal lobe broadly ovate, usually broader than long ..... **27. R. neomexicanus.**
    Leaves dark green above, paler beneath, the terminal lobe triangular, usually longer than broad ..... **28. R. trilobus.**
Leaves compound.
  Stipules broad, free or nearly so. Stems creeping ..... **1. R. pumilus.**
  Stipules narrow, linear-lanceolate or subulate, more or less adnate to the petioles.
    Fruit cup-shaped, falling off from the dry receptacle.
      Inflorescence racemose; fruit red; leaves pinnate ..... **5. R. strigosus.**
      Inflorescence corymbose; fruit black or purple; leaves palmate.
        Fruit hemispheric; sepals inclosing the fruit ..... **4. R. pringlei.**
        Fruit oblong; sepals reflexed in fruit.
          Leaves glabrate on the upper surface; fruit 8 to 15 mm. thick.
            2. R. glaucus.
          Leaves puberulent on the upper surface; fruit 6 to 8 mm. thick.
            3. R. eriocarpus.
    Fruit not cup-shaped, the carpels remaining on the fleshy receptacle and falling with it or falling off separately.
      Plants with prostrate biennial stems; leaflets coarsely toothed, deciduous.
        Leaves glabrous beneath or nearly so, except on the veins.
          25. R. humistratus.
        Leaves copiously pubescent beneath.
          Fruit sparsely pilose ..... **23. R. cymosus.**
          Fruit glabrous ..... **24. R. oligospermus.**
      Plants with usually erect or scandent perennial stems; leaflets finely and closely dentate, often evergreen.
        Drupelets few, falling off separately.
          Plants scandent; branches of the inflorescence unarmed; sepals obtuse.
            Stems tomentose, unarmed; leaflets stellate-puberulent on the upper surface, velvety-tomentose beneath ..... **21. R. scandens.**
            Stems inconspicuously pilose, prickly; leaflets glabrous above, puberulent beneath on the veins ..... **22. R. fagifolius.**
          Plants erect; branches of the inflorescence prickly; sepals acute or acuminate ..... **11. R. corifolius.**
        Drupelets united with the receptacle or, if falling separately, numerous.
          Stems and petioles densely hispid with long eglandular bristles.
            6. R. trichomallus.

[1] Pl. Nov. Hisp. 85. 1887.

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Stems and petioles not hispid or, if so, the bristles gland-tipped.
Stems and petioles with gland-tipped hairs.
Leaflets sparsely hairy beneath or glabrate___7. **R. verae-crucis.**
Leaflets densely pubescent beneath_____8. **R. adenotrichos.**
Stems and petioles without gland-tipped hairs, the inflorescence sometimes glandular-hairy.
Stems climbing or trailing; inflorescence conspicuously prickly.
Leaflets lance-ovate, long-acuminate_____17. **R. nelsonii.**
Leaflets broadly ovate or oval.
Leaflets oval, rounded or obtuse_____20. **R. alnifolius.**
Leaflets ovate, short-acuminate or acute.
Teeth of the leaflets broadly ovate; inflorescence with gland-tipped hairs_____18. **R. palmeri.**
Teeth of the leaflets lanceolate, directed upward; inflorescence without gland-tipped hairs.
19. **R. sapidus.**
Stems not climbing or trailing; inflorescence usually not prickly.
Drupelets pubescent; inflorescence prickly.
Leaflets cordate at base, soft-pubescent.
9. **R. philyrophyllus.**
Leaflets not cordate at base, sparsely pubescent.
10. **R. liebmannii.**
Drupelets glabrous; inflorescence slightly or not at all prickly.
Petals at least twice as long as the sepals.
Leaflets closely serrate with numerous sharp lanceolate teeth; drupelets few_____11. **R. coriifolius.**
Leaflets dentate with numerous small, rather distant teeth; drupelets numerous_____12. **R. schiedeanus.**
Petals slightly if at all exceeding the sepals.
Leaflets regularly dentate with rather short teeth, never cordate at base.
Inflorescence glandular and tomentose; leaflets pilose on the upper surface_____13. **R. macrogongylus.**
Inflorescence not glandular; leaflets finely stellate-pubescent on the upper surface____14. **R. smithii.**
Leaflets closely and irregularly or doubly serrate with lanceolate antrorse teeth.
Inflorescence copiously glandular-pubescent; inflorescence lax_____15. **R. uhdeanus.**
Inflorescence very sparsely or not at all prickly; inflorescence dense_____16. **R. abundus.**

1. **Rubus pumilus** Focke, Abh. Nat. Ver. Bremen 4: 155. 1874.

Chihuahua to Mexico, in mountain woods; type from San Andrés.

Stems creeping and rooting, sparsely prickly, with shredded bark; leaves reniform, simple, 3 to 4 cm. wide, often 3-lobed; flowers white; fruit red, 1 cm. broad.

2. **Rubus glaucus** Benth. Pl. Hartw. 173. 1845.

Morelos to Chiapas. Southward to Ecuador, the type locality.

Shrub, 1 to 3 meters high, the stems glaucous; leaves pinnate, the 3 leaflets ovate, 6 to 15 cm. long, white-tomentose beneath; flowers white; fruit dark purple, 1.2 to 2 cm. long.

3. **Rubus eriocarpus** Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1852: 162. 1853.

Veracruz and Puebla; type from Chinantla, Oaxaca. Central America.

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Shrub, 1 to 3 meters high, the stems glaucous, prickly; leaflets 3, 6 to 10 cm. long, finely serrate, long-acuminate, white-tomentose beneath; flowers white; fruit about 1 cm. long, the drupelets tomentose.

4. Rubus pringlei Rydb. N. Amer. Fl. **22**: 443. 1913.

Mexico and Hidalgo to Oaxaca and Chiapas. Guatemala; type from Volcán de Agua.

Shrub, 1 to 2 meters high; leaflets 3, prickly, 4 to 6 cm. long; flowers white; fruit 2 cm. long, red or purple, with a bloom.

5. Rubus strigosus Michx. Fl. Bor. Amer. **1**: 297. 1803.

Batidaea arizonica Greene, Leaflets **1**: 241. 1906.

Rubus arizonicus Rydb. N. Amer. Fl. **22**: 446. 1913.

Mountains of Chihuahua. Widely distributed in the United States, Canada, and Alaska.

Shrub, 0.3 to 1 meter high; leaflets 5 or 7, 3 to 6 cm. long, white-tomentose beneath; flowers white; fruit 1 cm. broad.

The fruit of this red raspberry is of good quality and is much used in regions where it is abundant. Some of the horticultural raspberries are forms of this species improved by cultivation.

6. Rubus trichomallus Schlecht. Linnaea **13**: 268. 1839.

Rubus urticaefolius Focke, Abh. Nat. Ver. Bremen **4**: 149. 1874. Not *R. urticaefolius* Poir. 1804.

Veracruz and Chiapas; type from Hacienda de la Laguna, Veracruz. Central America and Colombia.

Stems several meters high, pubescent; leaflets 3 or 5, ovate, 7 to 12 cm. long; flowers white; fruit reddish or almost black.

7. Rubus verae-crucis Rydb. N. Amer. Fl. **22**: 450. 1913.

Veracruz; type from San Miguel del Soldado.

Erect shrub, 5 to 7 meters high; leaflets 3 or 5, lanceolate, 5 to 10 cm. long; petals white, 1 cm. long.

8. Rubus adenotrichos Schlecht. Linnaea **13**: 267. 1839.

Veracruz, Morelos, Oaxaca, and Chiapas; type from Jalapa, Veracruz. Guatemala to Costa Rica.

Shrub, up to 9 meters high, the stems covered with reddish gland-tipped bristles; leaflets 3 or 5, 5 to 10 cm. long; petals white or pink, 1 cm. long; fruit red or black, 1 cm. thick.

9. Rubus philyrophyllus Rydb. N. Amer. Fl. **22**: 451. 1913.

Rubus tiliaceus Liebm. Nat. For. Kjöbenhavn Vid. Medd. **1852**: 161. 1853. Not *R. tiliaceus* Smith, 1815.

Rubus tiliaefolius Focke, Abh. Nat. Ver. Bremen **4**: 159. 1874. Not *R. tiliaefolius* Weine, 1825.

Known only from the type locality, Chinantla, Oaxaca.

Leaflets 3, 8 cm. long or shorter, short-acuminate.

10. Rubus liebmannii Focke, Abh. Nat. Ver. Bremen **4**: 158. 1874.

Mexico and Oaxaca; described from cultivated plants grown from seed gathered on Mount Zempoaltepec, Oaxaca.

Shrub, 2 to 3 meters high; leaflets 3, 4 to 10 cm. long, green; flowers rose-colored; fruit black, 1 cm. long.

11. Rubus coriifolius Liebm. Nat. For. Kjöbenhavn Vid. Medd. **1852**: 157. 1853.

Michoacán to Veracruz, Morelos, and Chiapas; type from Jalapa, Veracruz.

Shrub, 1.5 to 3.6 meters high; leaflets elongate-ovate, 5 to 10 cm. long, acuminate; flowers white or rose; fruit red or nearly black.

12. Rubus schiedeanus Steud. Nom. Bot. ed. 2. **2**: 479. 1841.

Rubus dumetorum Schlecht. Linnaea **13**: 267. 1839. Not *R. dumetorum* Weihe, 1824.

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Veracruz and Oaxaca; type from Jalapa, Veracruz. Guatemala.

Shrub, 1.5 to 7.5 meters high; leaflets 3 or 5, 4 to 10 cm. long, glabrous above, puberulent beneath; flowers white; fruit black.

13. **Rubus macrogongylus** Focke, Repert. Sp. Nov. Fedde 9: 236. 1911.

Veracruz. Guatemala.

Leaflets 3 or 5, oblong, acuminate; fruit black.

14. **Rubus smithii** Rydb. N. Amer. Fl. 22: 453. 1913.

Rubus poliophyllus Focke; Donn. Smith, Bot. Gaz. 18: 202. 1893. Not *R. poliophyllus* Kuntze, 1879.

Mexico. Guatemala; type from San Rafael.

Leaflets 3 or 5, oval or elliptic, 8 cm. long or shorter, abruptly acuminate; flowers white; fruit black.

15. **Rubus uhdeanus** Focke, Abh. Nat. Ver. Bremen 4: 159. 1874.

Mexico and Morelos.

Leaflets 3, pale beneath, 9 cm. long or shorter; petals white or pinkish, 8 mm. long; fruit black, about 1 cm. long.

16. **Rubus abundus** Rydb. N. Amer. Fl. 22: 454. 1913.

Rubus floribundus H. B. K. Nov. Gen. & Sp. 6: 219. 1823. Not *R. floribundus* Weihe, 1821.

Veracruz and Oaxaca. Central America to Bolivia; type from Andes of Loja, Ecuador.

Leaflets 3 or 5, 10 cm. long or shorter; flowers white or rose; fruit black, subglobose.

17. **Rubus nelsoni** Rydb. N. Amer. Fl. 22: 455. 1913.

Known only from the type locality, Mount Zempoaltepec, Oaxaca.

Stem reclining, 2 to 4 meters long; leaflets 3 or 5, 3 to 7 cm. long; flowers white; fruit dark purple, subglobose.

18. **Rubus palmeri** Rydb. N. Amer. Fl. 22: 456. 1913.

Durango, Sinaloa, Tepic, and Jalisco; type from San Ramón, Durango.

Stems reclining, 2 to 4 meters long; leaflets 3 or 5, 10 cm. long or shorter; flowers white; fruit black, of good flavor. "Guismora," "huismora" (Durango); "mora" (Sinaloa).

19. **Rubus sapidus** Schlecht. Linnaea 13: 269. 1839.

Veracruz; type from Jalapa.

Leaflets 3 or 5, dark green, 7 cm. long or shorter, acuminate; petals white, 1 cm. long; fruit globose.

20. **Rubus alnifolius** Rydb. N. Amer. Fl. 22: 457. 1913.

Known only from the type locality, San Miguel, Veracruz.

Stems decumbent or reclining; leaflets 3, oval, coriaceous, 3 to 5 cm. long; fruit dark purple, 1.5 to 2 cm. long.

21. **Rubus scandens** Liebm. Nat. For. Kjöbenhavn Vid. Medd. 1852: 154. 1853.

Veracruz; type from Mirador.

Stems climbing, often 6 meters long; leaflets 3 or 5; flowers white or pinkish; fruit dark purple.

22. **Rubus fagifolius** Schlecht. & Cham. Linnaea 5: 571. 1830.

Veracruz; type from Papantla.

Stems climbing, sometimes 5 meters long; leaflets 3 or 5, 12 cm. long or shorter, coriaceous; flowers white; fruit red, of 4 to 6 large drupelets.

23. **Rubus cymosus** Rydb. N. Amer. Fl. 22: 470. 1913.

Known only from the type locality, Tlalpam, Valley of Mexico.

Stems decumbent, prickly; leaflets 5, ovate, 5 to 8 cm. long; flowers white; fruit dark purple, globose, 1 cm. long.

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24. Rubus oligospermus Thornber; Rydb. N. Amer. Fl. **22**: 470. 1913.

Rubus scolocaulon T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 498. 1919.

Baja California and Sonora to San Luis Potosí and Jalisco. Southern Arizino; type from Santa Catalina Mountains.

Stems trailing, glabrous, 1 to 6 meters long; leaflets 3 or 5, 5 cm. long or shorter; flowers white.

This has been reported from Mexico as *R. trivialis* Michx.

25. Rubus humistratus Steud. Nom. Bot. ed. 2. **2**: 478. 1841.

Rubus humifusus Schlecht. Linnaea **13**: 270. 1839. Not *R. humifusus* Weihe & Nees, 1821.

Southern Mexico; type from Jalapa, Veracruz.

Stems prostrate, 1 to 2 meters long; leaflets 3, ovate, 3 to 6 cm. long; flowers white.

26. Rubus parviflorus Nutt. Gen. Pl. **1**: 308. 1818.

Rubacer parviflorum Rydb. Bull. Torrey Club **30**: 274. 1903.

Mountains of Chihuahua. Northward to Alaska and Ontario; type from Lake Huron.

Shrub, a meter high or less, unarmed, glandular-pubescent; leaves petiolate, reniform, 5 to 10 cm. wide, 3 or 5-lobed; flowers paniculate, the petals white, 1.5 to 3 cm. long; fruit thimble-shaped, red, 1.5 to 2 cm. wide, juicy, edible.

Known in the United States as "thimbleberry." The fruit is often gathered, but is of rather poor quality. It collapses when picked. The flowers are very showy and handsome.

27. Rubus neomexicanus A. Gray, Pl. Wright. **2**: 55. 1853.

Oreobatus neomexicanus Rydb. Bull. Torrey Club **30**: 275. 1903.

Northern Sonora. Arizona and New Mexico; type from Santa Rita, New Mexico.

Shrub, 1 to 3 meters high, with flaky bark; leaves cordate-reniform, 3 to 9 cm. wide, pubescent, long-petiolate; flowers white, the petals 2 to 2.5 cm. long; fruit 1.5 cm. broad, red.

28. Rubus trilobus Seringe in DC. Prodr. **2**: 566. 1825.

Rubus mexicanus Kuntze, Meth. Sp. 102. 1879.

Oreobatus trilobus Rydb. N. Amer. Fl. **22**: 428. 1913.

Veracruz, Puebla, Oaxaca, and Chiapas. Guatemala.

Shrub; leaves cordate, 3-lobed; petals white, 2 cm. long; fruit purple, 1.5 cm. broad.

DOUBTFUL SPECIES.

RUBUS MADRENSIS Jones, Contr. West. Bot. **12**: 14. 1908. Described from Chihuahua.

12. ROSA L. Sp. Pl. 491. 1753.

Erect shrubs, armed with prickles; leaves pinnate; flowers solitary or corymbose, large and showy; hypanthium enlarged and fleshy in fruit, bearing numerous achenes on the inner surface.

Many species of roses ("rosas") of European or Asiatic origin are cultivated in Mexico for their beautiful flowers. The fruits of some of the North American species are sweet and palatable when frosted, and they were eaten by the Indians, especially in winter, when food was scarce. Among the Tewa Indians of New Mexico a salve made from the petals is used for sore mouth, and a decoction of the fruit was employed by the Omaha as a wash for sore eyes. Some of the tribes smoked the inner bark, either alone or mixed with tobacco.

Leaflets mostly 5 to 10 mm. long; fruit densely spiny.....1. R. minutifolia.

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Leaflets mostly 1.5 cm. long or larger; fruit not spiny.
Leaflets glabrous beneath, without glands, thick_____2. R. montezumae.
Leaflets pubescent beneath, or with stalked glands, thin.
Rachis of the leaves, as well as the fruit, without large stalked glands. 3. R. fendleri.
Rachis of the leaves, and usually the fruit, with long-stalked glands.
Leaflets densely pubescent beneath, not glandular-ciliate. 4. R. californica.
Leaflets glabrous beneath but with numerous stalked glands, glandular-ciliate_____5. R. serrulata.

1. **Rosa minutifolia** Parry, Bull. Torrey Club 9: 97. 1882.

Baja California, abundant in places along arroyos and on mesas, up to an altitude of 300 meters; type from Bahía de Todos Santos.

Shrub, 0.5 to 1.5 meters high, the stems covered with stellate hairs; leaflets 3, 5 to 8 mm. long; petals deep rose purple to white, 1 to 1.5 cm. long.

2. **Rosa montezumae** Humb. & Bonpl.; Redouté, Roses 1: 55. 1817.

Rosa mexicana Willd. (Spreng. Syst. Veg. 2: 555. 1825, as synonym); Crép. Bull. Soc. Bot. Belg. 11: 82. 1872.

Mountains of Mexico and Hidalgo; type from the mountains of the Valley of Mexico.

Shrub, 1 to 2 meters high; leaflets 3 to 7, oval, acute, 1 to 2 cm. long; petals pink, 1.5 to 1.8 cm. long; fruit red. "Garambullo," "uña de gato," "rosa de Moctezuma," "cinorrodón," "agabanzo," "escaramujo" (Valley of Mexico); "trompillo" (Hidalgo, *Villada*).

The fruit is used in domestic medicine.

3. **Rosa fendleri** Crép. Bull. Soc. Bot. Belg. 15: 91. 1876.

Mountains of northern Chihuahua. Northward to Montana and South Dakota; type from New Mexico.

Shrub, 1 meter high or less; leaflets 5 or 7, 1 to 3 cm. long; petals pink, 1.5 cm. long; fruit red.

4. **Rosa californica** Cham. & Schlecht. Linnaea 2: 35. 1827.

Baja California. California; type from San Francisco.

Shrub, 1 to 3 meters high; leaflets 5 or 7, 1 to 2 cm. long; petals pink, 1.5 to 2.5 cm. long.

5. **Rosa serrulata** Raf. Ann. Gén. Phys. 5: 218. 1820.

Rosa mexicana S. Wats. Proc. Amer. Acad. 15: 354. 1882. Not *R. mexicana* Willd. 1825.

Coahuila and Nuevo León. Eastern United States; type from New York.

Shrub, 1 meter high or less; leaflets usually 5, 1 to 4 cm. long; petals pink, 1.5 to 2.5 cm. long.

61. MALACEAE. Apple Family.

Trees or shrubs, sometimes armed with spines; leaves alternate, stipulate, dentate or lobate; flowers perfect, solitary, racemose, corymbose, or cymose, often large and showy; petals 5; stamens usually numerous; fruit a pome, this consisting of the much enlarged, fleshy calyx tube, inclosing the papery or leathery seedlike carpels.

Several important cultivated fruit trees belong to this family, chief of which are the following: The apple, *Malus sylvestris* Mill. ("manzano," the tree, "manzana," the fruit; "belehui," Oaxaca, Zapotec, *Reko;* "tnutinumi," Oaxaca, Mixtec, *Reko*); the pear, *Pyrus communis* L. ("peral"); the quince, *Cydonia oblonga* Mill. ("membrillo"); and the loquat, *Eriobotrya japonica* Lindl. ("níspero"). All these are natives of the Old World. Bustamente states[1]

[1] In his edition of Andrés Cavo's Los Tres Siglos de México, p. 6. 1852.

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that the first apple trees were brought to Mexico by Gregorio López, and planted in Jalisco about 1522. Clavigero relates that the Jesuits planted apple trees in Baja California in the 18th century.

Carpels of the fruit hard and bonelike; plants usually armed with spines. 1. CRATAEGUS.

Carpels of the fruit thin and papery; plants without spines.
- Fruit large, 2 cm. in diameter or larger ..... 2. PHOTINIA.
- Fruit small, 1 cm. in diameter or smaller.
  - Leaves oblong or lanceolate, 8 to 10 cm. long, dentate ..... 3. HETEROMELES.
  - Leaves rounded or oval, 5 cm. long or shorter, entire or obscurely dentate. 4. AMELANCHIER.

1. CRATAEGUS L. Sp. Pl. 475. 1753.

REFERENCE: Eggleston, Bull. Torrey Club 36: 501–514. 1909.

Shrubs or small trees with dark brown, scaly bark, nearly always armed with long stout spines; leaves dentate or lobate, petiolate, deciduous; flowers white, corymbose, strong-scented, the odor often very disagreeable; fruit usually globose or pyriform; wood hard and tough.

The species (in the United States called "hawthorn" and "red haw") are known in Mexico under the name "tejocote" or "texocotl." Buelna gives the Otomí names as "dopri," "dopini," and "vipeni." The fruit is highly valued and is a common article in the markets. It is eaten raw or more commonly made into jelly or preserves. The trees are often cultivated. The fruit is reputed to have pectoral properties, although, apparently without sufficient basis. The roots are used in domestic medicine because of their supposed diuretic and antidysenteric properties. The wood, which is hard and compact, is used for various purposes.

Mexican specimens of the genus are reported by Sessé and Mociño[1] as *Crataegus crus-galli* and *Mespilus pyracantha.*

Branchlets, corymbs, and lower surface of leaves glabrous. Fruit red. 1. C. baroussana.

Branchlets, corymbs, and lower surface of leaves tomentose.
- Leaf blades broadly ovate, tomentose on both sides. Stamens about 10; styles 4 or 5; calyx lobes serrate; fruit red ..... 2. C. greggiana.
- Leaf blades mostly elliptic, lanceolate, or obovate.
  - Stamens 5 to 10. Styles 3 or 4; calyx lobes serrate; fruit red, with 3 or 4 nutlets ..... 3. C. rosei.
  - Stamens about 20.
    - Calyx lobes serrate. Styles usually 2 or 3; fruit yellow, with 2 or 3 nutlets ..... 4. C. pubescens.
    - Calyx lobes entire.
      - Leaf blades oblanceolate or obovate ..... 5. C. stipulosa.
      - Leaf blades mostly lanceolate or elliptic.
        - Styles 2 or 3; leaves glabrous on the upper surface. Fruit yellow, with 2 or 3 nutlets ..... 6. C. parryana.
        - Styles 3 to 5; leaves tomentose on the upper surface.
          - Leaf blades 3 to 9 cm. long; styles usually 3 or 4. Fruit orange ..... 7. C. mexicana.
          - Leaf blades 1.5 to 5 cm. long; styles usually 4 or 5 ..... 8. C. nelsoni.

1. **Crataegus baroussana** Eggleston, Torreya 7: 35. 1906.

Coahuila; type from mountains near Saltillo.

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[1] Pl. Nov. Hisp. 84, 85. 1887.

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Tree, 3.5 to 5.5 meters high; leaves elliptic-oval, 3 to 7 cm. long, serrate and shallowly lobed, bright green; fruit about 1 cm. in diameter.

2. **Crataegus greggiana** Eggleston, Bull. Torrey Club **36**: 511. 1909.

Coahuila; type from Saltillo.

Tree, 4.5 to 6 meters high, the trunk 15 to 30 cm. thick; spines 7 cm. long or shorter; leaves 4 to 7 cm. long, coarsely serrate.

3. **Crataegus rosei** Eggleston, Bull. Torrey Club **36**: 509. 1909.

Chihuahua to San Luis Potosí and Durango; type from Alvárez, San Luis Potosí.

Shrub or small tree, 3 to 9 meters high, the trunk up to 37 cm. in diameter; leaves 2.5 to 4 cm. long, serrate, lustrous; fruit often 1.5 cm. in diameter.

Wood white, tough, and durable; used for tool handles.

4. **Crataegus pubescens** (H. B. K.) Steud. Nom. Bot. ed. 2. 433. 1841.

Mespilus pubescens H. B. K. Nov. Gen. & Sp. **6**: 213. *pl. 565.* 1824.

Crataegus pubescens botterii Eggleston, Bull. Torrey Club **26**: 506. 1909.

Veracruz, Hidalgo, and Oaxaca; type from Morán, Hidalgo.

Tree, sometimes 10 meters high; leaves 3 to 8 cm. long, finely serrate or on young branches deeply lobate; fruit about 12 mm. long.

5. **Crataegus stipulosa** (H. B. K.) Steud. Nom. Bot. ed. 2. 433. 1841.

Mespilus stipulosa H. B. K. Nov. Gen. & Sp. **6**: 213. 1824.

Chiapas. Guatemala to Ecuador (type locality).

Tree; leaves 4 to 8 cm. long, acute or obtuse, tomentose beneath, finely serrate; fruit sometimes 2.5 cm. in diameter.

6. **Crataegus parryana** Eggleston, Bull. Torrey Club **36**: 510. 1909.

Known only from the type locality, Alvárez, San Luis Potosí.

Shrub or small tree, up to 4.5 meters high. "Tejocote ameco."

7. **Crataegus mexicana** Moc. & Sessé; DC. Prodr. **2**: 629. 1825.

Crataegus subserrata Benth. Pl. Hartw. 10. 1839.

Crataegus hypolasia Koch, Hort. Dendr. 167. 1853.

Crataegus mexicana microsperma Eggleston. Bull. Torrey Club **36**: 508. 1909.

San Luis Potosí to Jalisco, Oaxaca, and Veracruz.

Tree about 6 meters high; spines often very large and stout; leaves thick, lustrous, serrate or shallowly lobate; fruit 1 to 2 cm. in diameter. "Manzanita tejocotera" (Oaxaca).

8. **Crataegus nelsoni** Eggleston, Bull. Torrey Club **36**: 512. 1909.

Known only from the type locality near San Cristóbal, Chiapas, altitude 2,100 to 2,640 meters.

Spines stout, 4 to 6 cm. long; leaves lustrous, serrate and shallowly lobate.

2. PHOTINIA Lindl. Trans. Linn. Soc. Bot. **13**: 103. 1821.

1. **Photinia mexicana** (Baill.) Hemsl. Biol. Centr. Amer. Bot. **1**: 380. 1880.

Chamaemeles mexicana Baill. Adansonia **9**: 148. 1869.

In forests, mountains of Veracruz and Oaxaca; type from Veracruz.

Tree, about 9 meters high; leaves oblong, elliptic, or oval, 5 to 12 cm. long, petiolate, rounded to acutish at apex, shallowly crenate, thick, bright green, lustrous; flowers cymose-paniculate, brown-tomentose; fruit subglobose, usually 3 to 4 cm. in diameter, rough, tomentose when young; seeds dark reddish brown, 1.5 cm. long. "Peral silvestre" (Oaxaca).

The fruit somewhat resembles a small pear. It is said to be of good flavor. This plant is probably the one reported by Sessé and Mociño[1] as *Crataegus indica.*

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[1] Pl. Nov. Hisp. 84. 1887.

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3. HETEROMELES M. Roemer, Fam. Nat. Syn. 3: 105. 1837.

1. **Heteromeles salicifolia** (Presl) Abrams, Bull. N. Y. Bot. Gard. 6: 381. 1910.

Crataegus arbutifolia Ait. Hort. Kew. 3: 202. 1811. Not *C. arbutifolia* Lam. 1783.

Photinia arbutifolia Lindl. Trans. Linn. Soc. Bot. 13: 103. 1821.

Heteromeles arbutifolia M. Roemer, Fam. Nat. Syn. 3: 105. 1847.

Photinia salicifolia Presl, Epim. Bot. 204. 1849.

Baja California, ranging from sea level up to 1,680 meters. California; type from Monterey.

Shrub or tree, 2 to 9 meters high, sometimes with a trunk 45 cm. in diameter; bark thick, light gray, shallowly fissured; leaves persistent, oblong, acute, 8 to 10 cm. long, dentate; flowers small, white, in large panicles; fruit red or yellow, about 1 cm. long, astringent; wood hard, close-grained, reddish brown, its specific gravity about 0.93.

The tree is known in California as "tollon," "Christmas-berry," and "California holly." It is often used for Christmas decorations. The fruit is edible.

4. AMELANCHIER Medic. Phil. Bot. 1: 155. 1789.

Shrubs or small trees; leaves petiolate, persistent or deciduous, entire or denticulate; flowers racemose, solitary, or clustered, white, rather showy; fruit a small, juicy pome.

Leaves small, 0.7 to 1.8 cm. wide, the lateral nerves not very conspicuous beneath; calyx usually glabrous outside; inflorescence commonly short and umbelliform ..... 1. A. denticulata.

Leaves large, usually 2.3 cm. wide, the lateral nerves coarse and very conspicuous beneath; calyx densely white-tomentose outside; inflorescence elongate, racemose ..... 2. A. nervosa.

1. **Amelanchier denticulata** (H. B. K.) Koch, Dendrol. 1: 183. 1869.

Cotoneaster denticulata H. B. K. Nov. Gen. & Sp. 6: 169. *pl. 556.* 1823.

Nagelia denticulata Lindl. Bot. Reg. 31: Misc. 40. 1845.

Crataegus minor Sessé & Moc. Pl. Nov. Hisp. 84. 1887.

Chihuahua and Coahuila to Mexico and Oaxaca; type from Actopan, Hidalgo.

Erect shrub, 1 to 3.5 meters high, densely branched, the branches gray or brown; leaves 1 to 2.5 cm. long, entire or denticulate; flowers about 1 cm. broad; fruit red, dark purple, or black, 8 to 10 mm. long. "Membrillito" (Veracruz); "membrillo cimarrón," "tlaxisqui," "tlaxistle" (Valley of Mexico); "membrillo" (Oaxaca); "madronillo" (Coahuila).

The fruit is edible. The stems, according to Herrera, are made into canes, known as "varitas de Apizaco," which are notable for their flexibility. In the typical form of the species the calyx is tomentose outside, but in most of the specimens the calyx is glabrous. The northern (glabrous) form may be a distinct species, but there seem to be some intermediate specimens. *Crataegus inermis* Sessé & Moc.[1] is perhaps another synonym of this species.

2. **Amelanchier nervosa** (Decaisne) Standl.

Cotoneaster nervosa Decaisne, Nouv. Arch. Mus. Paris 10: 177. 1874.

Chiapas and Oaxaca.

Leaves 3 to 4.5 cm. long, very thick, bright green on the upper surface, white or gray-tomentose beneath, usually entire.

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[1] Pl. Nov. Hisp. 84. 1887.

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62. AMYGDALACEÆ. Almond Family.

Trees or shrubs; leaves alternate, entire or serrate, persistent or deciduous, stipulate; flowers perfect, often showy, usually solitary, cymose, corymbose, or racemose; petals 5; stamens numerous; fruit a drupe.

Style subterminal; leaves often serrate ..... 1. **PRUNUS.**
Style basilar; leaves entire.
  Stamens 3 to 10.
    Petals none or minute ..... 2. **LICANIA.**
    Petals 5 ..... 3. **HIRTELLA.**
  Stamens 15 to many.
    Anthers linear, elongate ..... 4. **LECOSTEMON.**
    Anthers short, didymous or rounded.
      Calyx tube elongate; inflorescence racemose or paniculate; ovary adnate to the throat of the calyx ..... 5. **COUEPIA.**
      Calyx tube campanulate; inflorescence cymose; ovary sessile in the bottom of the calyx ..... 6. **CHRYSOBALANUS.**

1. PRUNUS L. Sp. Pl. 473. 1753.

REFERENCE: Koehne, Bot. Jahrb. Engler 52: 279–333. 1915.

Trees or shrubs; leaves serrate or entire, the teeth often gland-tipped; flowers solitary, corymbose, umbellate, or racemose; fruit glabrous or pubescent.

Several important fruit trees of this genus are cultivated in Mexico, chief of which are the following: The peach, *Prunus persica* (L.) Sieb. & Zucc., "durazno," "melocotón," "prisco," "albérchigo," "pahsh" (Mixe, *Belmar*), "ñhcanzà," "ixi" (Otomí, *Buelna*); the apricot, *P. armeniaca* L., "chabacano," "albaricoque," "damasco"; the almond, *P. communis* (L.) Fritsch, "almendro" (the tree), "almendra" (the fruit); various plums, *P. domestica* L., *P. insititia* L., etc., "ciruelo," "ciruelo de España"; and cherries, *P. cerasus* L., "cerezo," (the tree), "cereza" (the fruit), "guindo." All these were doubtless introduced into Mexico by the Spaniards at an early date. It is of interest to note that peaches were probably introduced into the United States directly from Mexico. Havard remarks[1] upon the subject as follows:

"The Indians certainly exhibited commendable promptness and industry, after the advent of the whites, in introducing such fruits as were shown to be desirable. Thus the Peach brought to Mexico soon after the conquest was, according to the testimony of Du Pratz, found in general cultivation among the Indians of Louisiana when the French settled that province in 1698, and had become abundant in Georgia at the time of the settlement of the English in 1732. Wm. Bartram describes the carefully planted Orange groves of the Indians which he noticed in 1773. The early introduction and propagation of these two plants by the Indians led to the erroneous impression that they were of American origin."

Flowers solitary, fascicled, or umbellate; ovary often pubescent.
  Flowers umbellate; fruit large, 1.8 to 2.5 cm. long, glabrous ..... 1. **P. mexicana.**
  Flowers solitary or fasciculate; fruit usually less than 1 cm. long.
    Ovary glabrous ..... 2. **P. apodantha.**
    Ovary pubescent.
      Leaves entire or nearly so.
        Leaves oval or obovate ..... 3. **P. minutiflora.**
        Leaves linear-oblanceolate ..... 4. **P. fasciculata.**

[1] V. Havard, Food plants of the North American Indians, Bull. Torrey Club 22: 98–123. 1895.

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Leaves serrate or serrulate.
Leaf blades orbicular or broadly ovate, finely serrate; flowers pedicellate ..... 5. P. fremontii.
Leaf blades oblong or obovate, serrate; flowers subsessile. 6. P. microphylla.
Flowers racemose; ovary glabrous.
Racemes terminating short leafy branches; leaves finely serrulate.
Leaf blades mostly 4 to 6 cm. long, obtuse or acute; racemes 4 to 6 cm. long ..... 7. P. virens.
Leaf blades mostly 6.5 to 10 cm. long, abruptly acuminate or long-acuminate; racemes usually 7 to 15 cm. long ..... 8. P. capuli.
Racemes axillary, naked; leaves entire or coarsely serrate or dentate.
Leaves serrate or dentate, or rarely entire, the fruit then 1.5 to 2 cm. long.
Leaves entire ..... 9. P. lyoni.
Leaves serrate or dentate.
Leaf blades suborbicular or rounded-ovate; racemes equaling or longer than the leaves ..... 10. P. ilicifolia.
Leaf blades lance-oblong; racemes much shorter than the leaves. 11. P. prionophylla.
Leaves entire.
Calyx persistent beneath the fruit. Leaves barbate beneath. 12. P. rhamnoides.
Calyx deciduous.
Calyx villous within at the base; petals barbate above the base. 13. P. cortapico.
Calyx glabrous within; petals glabrous.
Racemes all or mostly in clusters of 2 to 4 ..... 14. P. samydoides.
Racemes solitary.
Leaf blades without glands beneath; branches tuberculate by the elevated lenticels ..... 15. P. tuberculata.
Leaf blades with 2 or more glands beneath near the base; branches smooth or nearly so.
Glands 3 or 4 beneath, 2 of them near the base close to the costa, the others near the lateral veins ..... 16. P. tetradenia.
Glands 2, at the base of the blade near the costa.
Petioles 5 to 10 mm. long; petals 2.3 to 2.7 mm. long; anthers 1 to 1.2 mm. long; stigma 1.3 to 1.5 mm. broad. 17. P. erythroxylon.
Petioles 12 to 22 mm. long; petals 1.5 to 2 mm. long; anthers 0.6 to 0.8 mm. long; stigma 0.4 to 1 mm. broad. 18. P. brachybotrya.

1. **Prunus mexicana** S. Wats. Proc. Amer. Acad. 17: 353. 1882.

Coahuila and Nuevo León; type from Lerios, Coahuila. Southern United States.

Small tree; leaves lanceolate or ovate, 5 to 12 cm. long; flowers white, 2 cm. broad; fruit purplish red, with a bluish bloom, sometimes 2.5 cm. in diameter.

This species has often been confused with *P. americana* Marsh. and *P. nigra* Ait., both natives of the United States. Those two species are the source of many of the cultivated plums. In the wild state the fruit is of fair quality, but it is greatly improved by cultivation. There is reason to believe that these wild plums were cultivated by the Indians, although, as Havard remarks, the Indian orchards were perhaps only the result of seeds accidentally dropped about villages and camping grounds.

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2. **Prunus apodantha** Blake, Contr. Gray Herb. n. ser. **52**: 68. 1917.

Known only from the type locality, Río Hondo, State of Mexico.

Shrub, 60 cm. high; leaves oval, 1.5 to 3 cm. long, 1 to 1.5 cm. wide, obtuse, crenate-serrate, pilose beneath; petals 3.3 mm. long.

3. **Prunus minutiflora** Engelm. Bost. Journ. Nat. Hist. **6**: 185. 1850.

Reported from Chihuahua. Western Texas; type collected between San Antonio and New Braunfels.

Shrub 30 to 60 cm. high, densely branched; leaves 1 to 2 cm. long, pubescent beneath or glabrate; fruit 8 to 12 mm. long.

4. **Prunus fasciculata** (Torr.) A. Gray, Proc. Amer. Acad. **10**: 70. 1874.

Emplectocladus fasciculatus Torr. in Frém. Rep. Exped. Rocky Mount. 10. *pl. 5.* 1850.

Amygdalus fasciculata Greene, Fl. Franc. 49. 1891.

Baja California, on dry slopes. Southern California (type locality) to Utah and Arizona.

Densely branched shrub, 1 to 2.5 meters high, with gray bark; leaves 1 to 1.5 cm. long; flowers very small, the petals white, linear; fruit 10 to 12 mm. long, densely pubescent, with very thin flesh.

5. **Prunus fremontii** S. Wats. Bot. Calif. **2**: 442. 1880.

Amygdalus fremontii Abrams, Bull. N. Y. Bot. Gard. **6**: 385. 1910.

Northern Baja California. Southern California, the type from San Diego County.

Shrub, sometimes 4.5 meters high, with stiff spinescent branches; leaves about 1 cm. long, thin, deciduous; flowers white, about 1 cm. broad.

6. **Prunus microphylla** (H. B. K.) Hemsl. Biol. Centr. Amer. Bot. **1**: 368. 1888.

Amygdalus microphylla H. B. K. Nov. Gen. & Sp. **6**: 243. *pl. 564.* 1823.

San Luis Potosí to Hidalgo; type collected between Pachuca and Morán, at an altitude of 2,340 meters.

Shrub, about a meter high, densely branched; leaves 1 to 1.5 cm. long; flowers small, white.

7. **Prunus virens** (Woot. & Standl.) Standl.

Prunus salicifolia acutifolia S. Wats. Proc. Amer. Acad. **22**: 411. 1887.

Padus virens Woot. & Standl. Contr. U. S. Nat. Herb. **16**: 132. 1913.

In mountain canyons, Chihuahua and Sonora to Durango and San Luis Potosí. Southern Arizona to western Texas; type from Organ Mountains, New Mexico.

Tree, usually about 7 meters high, with smooth, thin, reddish brown bark, the top broad and spreading, dense; leaves ovate or ovate-oblong, bright green; flowers small, white; fruit black, about 1 cm. in diameter, sweet, edible.

Perhaps not sufficiently distinct from *P. capuli.*

8. **Prunus capuli** Cav. Anal. Hist. Nat. (Madrid) **2**: 110. 1800.

Prunus salicifolia H. B. K. Nov. Gen. & Sp. **6**: 190. *pl. 563.* 1823.

Cerasus capollin DC.; Seringe in DC. Prodr. **2**: 539. 1825.

Sonora to Chiapas and Veracruz. Guatemala to Peru; type from Ecuador.

Shrub or usually a tree, sometimes 15 meters high, with a trunk nearly a meter in diameter, the bark reddish brown or grayish, nearly smooth, the crown broad; leaves lanceolate to ovate, lustrous, nearly glabrous; flowers small, white; fruit red or black, 1 cm. in diameter or smaller. Generally known as "capulín," "capulí," or "capollín" (the name doubtless applied to other species also, and applied to this species in Peru and Ecuador); "tnun-

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daya" (Oaxaca, Mixtec, *Reko*); "xeugua" (Michoacán, *León*); "cerezo" (Guatemala); "pa kshmuk" (Mixe, *Belmar*); "detze," "ghohto" (Otomí *Buelna*).

The wood is of good quality and is much used for general carpentry and cabinet work. The large juicy fruit is highly esteemed, and for this reason the trees are sometimes planted about houses. In early times, at least, an intoxicating drink was made from the fruit. The juice or the fruits are sometimes mixed with cornmeal to make a kind of cake known as "capultamal" or "capoltamalli." The bark, leaves, or seeds, when crushed in contact with water, develop hydrocyanic acid, and under proper conditions they may poison animals which eat them; the same is true of other members of the genus. The distilled water of the leaves is substituted in Mexico for cherry laurel water, and has the same antispasmodic properties. A decoction of the bark is employed for dysentery and is reputed also. without sufficient basis apparently, to have febrifuge properties. The bark of *Prunus serotina* Ehrh. of the United States, a closely similar species, is official in the U. S. Pharmacopoeia. It has tonic properties and the power of calming irritation and diminishing nervous excitability. It has been employed extensively for the hectic fever which accompanies scrofula and tuberculosis. The fruit of the same species has been much used for flavoring spirituous liquors and various nonintoxicating beverages.

The fruit of *Prunus capuli* is mentioned by the earliest Spanish visitors to Mexico. Bernal Diaz del Castillo, in relating the hardships of the siege of Mexico in 1521, when the Spaniards and their allies were often in the direst straits for want of food, says, "Corn we had sufficiency of, but we wanted refreshments for the wounded. What preserved us was the plant called *quilites*, cherries while in season, and tunas or Indian figs." Sahagún treats of the tree under the name "capulín." The juice of the leaves and young shoots, he states, was dropped into the eyes to heal inflammation, and the kernels of the seeds were roasted and eaten. Hernández also treats of the plant in a chapter,[1] accompanied by a figure, entitled "De *Capolin*, seu Ceraso dulci indica." "The fruits," he says, "are slightly acid and astringent, although when fully ripe they are sweet and lose a great part of their harshness; and by some persons they are considered in no wise inferior to our cherries. In nature they are hot, dry, and somewhat astringent. They are made into bread and wine in times of scarcity. They furnish a sad food, and one which is hurtful in a way to the heart; and they impart a black color to the teeth if they are eaten for a long time, but this can be removed easily with attention and dentifrices; and there are not lacking persons who prefer these to all the other spring fruits, even those of the Old World. The tree flowers in spring and bears fruit nearly all summer long. It thrives in temperate regions, such as Mexico, where these trees grow in the gardens and plains, cultivated or wild. The decoction of the bark, put in the sun for fifteen days, and drunk in a dose of a drachm, cures dysentery; and the powdered bark removes ulcers from the eyes. clears the vision, and relieves inflammation of the eyes; and it moistens the tongue if it be dry from burning fever, as does also the liquor or juice from the young shoots."

9. **Prunus lyoni** (Eastw.) Sarg. Pl. Wilson. 74. 1911.

Cerasus lyoni Eastw. Handb. Trees Calif. 54. 1905.

Prunus ilicifolia integrifolia Sudw. Gard. & For. 4: 51. 1891.

Prunus integrifolia Sarg. Man. Trees N. Amer. 531. 1905.

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[1] Thesaurus 95. 1651.

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Reported from northern Baja California. Southern California.

Tree, sometimes 12 meters high, with a trunk 45 cm. in diameter; bark thick, gray; leaves ovate or ovate-lanceolate, 5 to 8 cm. long, acute, leathery; fruit purple, rounded, 1.5 to 2 cm. in diameter.

10. **Prunus ilicifolia** (Nutt.) Walp. Repert. Bot. **2**: 10. 1843.

Cerasus ilicifolia Nutt.; Hook. & Arn. Bot. Beechey Voy. 340. 1832.

Laurocerasus ilicifolia Roem. Syn. Rosifl. 92. 1847.

Baja California, on mesas and in canyons. California; type from Santa Barbara.

Shrub or, northward, a tree 10 meters high; bark thick, reddish brown, fissured; leaves 6 cm. long or shorter, with spiny teeth; fruit subglobose, purple or reddish yellow, about 1.5 cm. in diameter; wood hard, strong, its specific gravity about 0.98. "Islây" (Baja California, California; sometimes written "yslay").

The fruit of the holly-leaf cherry is edible, but the flesh, although of good flavor, is very scant. It is gathered by the people of Baja California. The Coahuilla Indians of California made use of the seeds for food. These were gathered in large quantities and spread in the sun to dry. They were then cracked and the kernels extracted and crushed in a mortar, then leached in a sand basket through which water was poured. The meal thus obtained was made into atole.

11. **Prunus prionophylla** Standl. Contr. U. S. Nat. Herb. **20**: 213. 1919.

Known only from the type locality, Ixtaccihuatl, at an altitude of 2,100 to 2,400 meters.

Leaves about 10 cm. long, persistent, acute, serrate.

12. **Prunus rhamnoides** Koehne, Bot. Jahrb. Engler **52**: 283. 1915.

Jalisco and Durango. Guatemala; type from San Miguel Uspantán.

Tree, 7.5 to 15 meters high; leaves ovate or lanceolate, 5.5 to 9 cm. long, attenuate, bright green; flowers about 5 mm. broad. "Iza" (Durango).

The Mexican specimens are variable but do not seem essentially different from the type. Reputed poisonous to cattle.

13. **Prunus cortapico** Kerber; Koehne, Bot. Jahrb. Engler **52**: 307. 1915.

Known only from Colima, the type locality.

Tree with lance-oblong leaves; racemes much shorter than the leaves. "Cortapico," "carretero."

14. **Prunus samydoides** Schlecht. Linnaea **13**: 92. 1839.

Laurocerasus samydoides Roem. Syn. Rosifl. **3**: 92. 1847.

Veracruz to Hidalgo; type from Hacienda de la Laguna, Veracruz.

Small tree; leaves oval-lanceolate, 9 cm. long or smaller, persistent, glabrous.

15. **Prunus tuberculata** Koehne, Bot. Jahrb. Engler **52**: 308. 1915.

Known only from the type locality, Monte Pelado, Oaxaca.

Tree; leaves lance-oblong; racemes much shorter than the leaves.

16. **Prunus tetradenia** Koehne, Bot. Jahrb. Engler **52**: 309. 1915.

Veracruz and Oaxaca; type collected between Misantla and Naolinco, Veracruz.

Shrub; leaves oblong-lanceolate to oval, 6 to 15 cm. long, acute, bright green.

17. **Prunus erythroxylon** Koehne, Bot. Jahrb. Engler **52**: 309. 1915.

Colima and Michoacán; type from Mesa del Cerrero, near Colima.

Tree with hard wood; leaves oblong to oval, 14 cm. long or less, coriaceous; flowers about 8 mm. broad; fruit black.

Perhaps not sufficiently distinct from the next species.

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18. **Prunus brachybotrya** Zucc. Abh. Akad. Wiss. München 2: 348. 1837.
Prunus laurifolia Schlecht. Linnaea 13: 91. 1839.
Prunus schiedeana Steud. Nom. Bot. ed. 2. 2: 404. 1841.
Laurocerasus mexicana Roem. Syn. Rosifl. 3: 90. 1847.
Laurocerasus brachybotrya Roem. Syn. Rosifl. 3: 91. 1847.
Veracruz to Oaxaca.

Tree, sometimes very large, with large, oblong to oval, bright green leaves. "Cerezo" (Oaxaca).

DOUBTFUL OR EXCLUDED SPECIES.

Hemsley reported *Prunus demissa* (Nutt.) Walp. and *P. virginiana* L. from Mexico, but the reports are doubtless based on incorrect determinations.

PRUNUS FERRUGINEA (Seringe) Steud. Nom. Bot. ed. 2. 2: 400. 1841. *Cerasus ferruginea* Seringe in DC. Prodr. 2: 540. 1825. Described from Mexico. Said to have obovate leaves. Probably not of this genus.

2. LICANIA Aubl. Pl. Guian. 1: 119. 1775.

Trees, glabrous or pubescent; leaves small or large, short-petiolate; flowers small, paniculate; fruit often very large.

Leaves 2 to 3 cm. wide, glabrous. Ovary glabrous ..... 1. L. retifolia.
Leaves 5.5 to 12 cm. wide, often pubescent.
Leaves oval or rounded-oval, 8.5 to 13 cm. long, broadly rounded or subcordate at base, tomentulose beneath when young; ovary glabrous. 2. L. arborea.
Leaves oblong to oblong-oblanceolate, 16 to 35 cm. long or larger, rounded or acute at base, glabrous or nearly so beneath; ovary strigillose. 3. L. platypus.

1. **Licania retifolia** Blake, Contr. Gray Herb. 52: 66. 1917.

Known only from the type locality, Cerro de los Cajones, Michoacán or Guerrero, altitude 1,000 meters.

Tree, 5 to 8 meters high; leaves lanceolate or obovate, 4.3 to 10 cm. long, acute to rounded at apex, bright green; flowers small, greenish white.

2. **Licania arborea** Seem. Bot. Voy. Herald 118. *pl. 25.* 1853.
Licania seleriana Loes. Verh. Bot. Ver. Brand. 53: 55. 1911.

Guerrero and Oaxaca; reported from Morelos and Michoacán. Central America; type from Panama.

Tree, 4.5 to 6 meters high or larger; leaves short-petiolate, thick, pale beneath, the venation very conspicuous; panicles 15 to 20 cm. long, the flowers yellowish; fruit 2.5 cm. long or larger, containing a single large oily seed. "Cacahuananche," "cacahuate," "cacahoanantzin," "quirindol cacahuananche," "quirindal," "caña dulce," "cacahoananche" (Guerrero, Morelos, Oaxaca, etc.); "frailecillo," "palo de fraile," "totopostle" (Oaxaca); "alcornoque" (Costa Rica); "encina" (Guatemala, Honduras).

The seeds contain about 30 per cent of oil, and burn readily when ignited. They are often strung on sticks and used for illuminating purposes. The oil is extracted in large quantities and is used for making candles, soap, axle grease, etc. It has a peculiar odor and a disagreeable flavor, and a green color which it imparts to soap made from it.[1]

[1] See J. C. Segura & M. D. Cordero, Reseña sobre el cultivo de algunas plantas industriales, pp. 33–40. 1884.

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The writer has seen no authentic material of *L. seleriana*, but from the description it does not appear essentially different.

3. **Licania platypus** (Hemsl.) Fritsch, Ann. Naturhist. Hofmus. Wien 4: 53. 1889.

Moquilea platypus Hemsl. Biol. Centr. Amer. Bot. 1: 366. 1880.

Oaxaca. Central America; type from Granada, Nicaragua.

Tree, 10 to 15 meters high; leaves short-petiolate, rounded to short-acuminate at the apex; panicles large, many-flowered; fruit obovoid, 13 cm. long or larger, rough, edible. "Mesonzapote" (from *mezontli*, the crown of leaves left after cutting the heart of the *maguey*, and *zapote*); "caca de niño," "zapote amarillo," "zapote borracho," "zapote cabello" (Oaxaca); "zapote" (Costa Rica).

3. HIRTELLA L. Sp. Pl. 32. 1753.

1. **Hirtella americana** Aubl. Pl. Guian. 247. *pl. 98.* 1775.

Hirtella oblongifolia DC. Prodr. 2: 529. 1825.

? *Hirtella acavacensis* DC. Prodr. 2: 529. 1825.

Guerrero to Chiapas and Tabasco. Central America and South America; type from French Guiana.

Shrub, 2 to 4.5 meters high, with hirsute stems; leaves oblong, elliptic, or oblong-ovate, 5 to 10 cm. long, acute or acuminate, with an obtuse tip, short-petiolate; flowers small, in long loose racemes, the petals pink or purplish, the stamens long-exserted; fruit about 1 cm. long. "Icaquillo" (Tabasco, Oaxaca); "cajetillo" (Guerrero); "icaco de aura," "teta de yegua" (Cuba).

The bark is said to be astringent, and that of some species is used in Brazil for tanning.

DOUBTFUL SPECIES.

HIRTELLA CASTANEA D. C. Prodr. 2: 528. 1825. Based upon a drawing by Mociño and Sessé, believed to represent a Mexican plant. Probably the same as *H. triandra* Swartz.

4. LECOSTEMON Moc. & Sessé; DC. Prodr. 2: 539. 1825.

1. **Lecostemon terniflorum** Moc. & Sessé; DC. Prodr. 2: 539. 1825.

Described from Mexico, but not known from specimens.

Shrub; leaves oval or obvate-oval, rounded to acutish at apex; peduncles 3-flowered.

The plant is altogether doubtful, and nothing which closely resembles it has been collected recently. Other species are known from South America.

5. COUEPIA Aubl. Pl. Guian. 1: 519. 1775.

Trees or shrubs; leaves short-petiolate, coriaceous; flowers paniculate, small, tomentulose; fruit often large.

Stamens 18 to 21 ---------- 1. C. polyandra.
Stamens 10 to 15 ---------- 2. C. dodecandra.

1. **Couepia polyandra** (H. B. K.) Rose, Contr. U. S. Nat. Herb. 5: 196. 1899.

Hirtella polyandra H. B. K. Nov. Gen. & Sp. 6: 246. *pl. 565.* 1821.

Couepia kunthiana Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 367. 1880.

Sinaloa to Oaxaca; type from Acapulco, Guerrero.

Shrub or tree, 3 to 8 meters high; leaves oblong or oval, 5.5 to 13 cm. long, rounded or short-acuminate at apex, whitish-tomentose beneath; flowers about 1 cm. long, cream-colored, in short dense panicles; fruit obovoid, yellow, sometimes 7.5 cm. long, edible. "Zapotillo" (Tepic, Guerrero); "zapote amarillo" (Guerrero); "guayabito de tinta" (Sinaloa).

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2. **Couepia dodecandra** (DC.) Hemsl. in Hook. Icon. Pl. 27: *pl. 2620, 2621.* 1899.

Hirtella dodecandra DC. Prodr. 2: 529. 1825.

Type from somewhere in Mexico; cultivated in Tabasco and British Honduras.

Tree, 4.5 to 6 meters high, leaves oblong, 5 to 15 cm. long, tomentose beneath; fruit ellipsoid, 5 to 6.5 cm. long, 1 or 2-seeded. "Pío," "uspío" (Tabasco).

Known in British Honduras as "baboon-cap." Fruit said to be edible.

6. CHRYSOBALANUS L. Sp. Pl. 513. 1753.

1. **Chrysobalanus icaco** L. Sp. Pl. 513. 1753.

Along the coast, Tamaulipas to Yucatán; Guerrero to Oaxaca. Widely distributed in tropical America and western Africa; type from Jamaica.

Low shrub, 1 to 1.5 meters high, or said sometimes to be a tree 9 meters high, with a trunk 30 cm. in diameter; bark thin, scaly, brownish gray; leaves persistent, broadly elliptic to orbicular, 5 to 7 cm. long, nearly sessile, leathery; flowers cymose, small, whitish; fruit globose or nearly so, 2 to 4 cm. in diameter, creamy white, pink, purple, or blue-black, the flesh white, sweet, juicy; wood hard, strong, close-grained, light brown, its specific gravity about 0.77. "Icaco," "hicaco," or "jicaco" (Chiapas, Veracruz, Yucatán, Oaxaca, Guerrero, Tamaulipas, Guatemala, Honduras, Porto Rico; the name of Antillean origin); "xicaco" (Oaxaca, *Seler*).

The English names are "cocoa-plum" and "pigeon-plum." The bark, leaves, and root are astringent and have been used for dysentery, etc. The leaves and fruit furnish a black dye. The seeds contain a large amount of oil, and by the Caribs they were strung on sticks and burnt like candles. The seeds are edible also. The fruit is highly valued in some parts of Mexico and elsewhere in tropical America and was a favorite food of the Caribs. It is astringent until perfectly ripe, when it is sweet and insipid. It is eaten raw but more often made into preserves, which are sold in Mexican markets. For an illustration of a fruiting branch see Contr. U. S. Nat. Herb. 8: *pl. 26.*

The "hicaco" is well described by Oviedo (Lib. VIII, Cap. IX). "The skin of the fruit," he writes, "has some resemblance to that on a monkey's face; for no matter how young a monkey is, it seems old because of its wrinkles, and likewise the *hicaco* fruit, no matter how fresh it may be, is always full of wrinkles."

63. CONNARACEAE. Connarus Family.

REFERENCE: Britton, N. Amer. Fl. 22: 233–236. 1908.

Shrubs or trees; leaves alternate, estipulate, odd-pinnate, the leaflets entire; flowers small, perfect, paniculate; fruit a 1-seeded follicle.

Calyx lobes imbricate, accrescent in age ..... 1. ROUREA.
Calyx lobes valvate, not accrescent ..... 2. CNESTIDIUM.

1. ROUREA Aubl. Pl. Guian. 1: 467. 1775.

1. **Rourea glabra** H. B. K. Nov. Gen. & Sp. 7: 41. 1824.

Rourea oblongifolia Hook. & Arn. Bot. Beechey Voy. 283. 1836.

Tamaulipas to Tepic and southward. Central America to Venezuela; West Indies; type from the Río Orinoco.

Scandent or erect shrub; leaflets 3 or 5, oblong to ovate-elliptic, 3 to 12 cm. long, acuminate, thick, lustrous, glabrous; panicles few or many-flowered, pubescent; petals white; fruit 1 to 1.7 cm. long, the seeds large, dark brown, with a large orange aril. "Chilillo" (Oaxaca, Tamaulipas, Veracruz); "chilillo de la Huasteca" (Guerrero, Tepic, Veracruz); "chilillo venenoso" (Tepic, Vera-

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cruz); "palo de chilillo" (Puebla); "canjura" (El Salvador); "mata-negro" (Cuba); "bejuco de garrote," "Juan caliente" (Porto Rico).

The seeds, as well as other parts of the plant, are reported to be very poisonous, especially to carnivorous animals (they are even said to be harmless to other orders of animals), and they are used for poisoning coyotes. They are employed also as a remedy for cutaneous diseases. The roots contain long resistant fibers and are used as cordage. They are said also to dye skins a bright purple. The poisonous properties of Old World species of the genus are well known.

2. CNESTIDIUM Planch. Linnaea 24: 439. 1850.

1. Cnestidium rufescens Planch. Linnaea 23: 440. 1850.

Veracruz, Oaxaca, and Tabasco. Cuba; Central America, the type from Panama.

Subscandent shrub, 3 meters high or more; leaflets 5 to 9, ovate-oblong or oblong-obovate, 3 to 8 cm. long, obtuse or short-acuminate, velvety-pubescent beneath; fruit 1.5 cm. long, curved, brown-tomentose; seed lustrous, with a large fleshy aril.

64. KRAMERIACEAE. Krameria Family.

1. KRAMERIA Loefl. Iter Hisp. 195. 1758.

Low, erect or procumbent shrubs with usually sericeous or strigose pubescence; leaves alternate, estipulate, small, simple and entire or trifoliolate; flowers showy, perfect, solitary and axillary or racemose; sepals 4 or 5; petals 5; stamens 4; fruit coriaceous, globose or nearly so, indehiscent, covered with numerous spines.

The dried roots of *Krameria triandra* Ruiz & Pavón, *K. ixina* L., and *K. argentea* Mart., all South American species, are official in the U. S. Pharmacopoeia. In commerce they are known as rhatany roots. They are used as a tonic and powerful astringent in the case of chronic diarrhoea, passive hemorrhages, etc. The Mexican species probably have the same properties, and their roots have been exported. The plants also yield a yellow or brownish red dye, and are employed locally in Mexico for coloring wool and skins. The roots of some species have been used in Europe for making ink, coloring wine, and manufacture of dentifrices. The names "encinilla" (Nuevo León) and "guachapurillo" (Sinaloa) are reported for species of doubtful determination. The name *Krameria ixina* has been applied to some of the Mexican species by Sessé and Mociño[1] and other writers.

Leaves 3-foliolate ..... 1. K. cytisoides.
Leaves simple.
  Fruit glabrous ..... 2. K. palmeri.
  Fruit densely pilose or sericeous.
    Leaves petiolate, 5 to 7 mm. wide ..... 3. K. cuspidata.
    Leaves sessile, usually much less than 5 mm. wide.
      Pedicels densely glandular ..... 4. K. glandulosa.
      Pedicels not glandular.
        Stems procumbent, chiefly herbaceous.
          Flowers yellow; leaves sericeous ..... 5. K. secundiflora.
          Flowers purple; leaves glabrate ..... 6. K. prostrata.
        Stems erect, often woody throughout.
          Spines of the fruit not barbed ..... 7. K. ramosissima.
          Spines of the fruit barbed.

[1] Pl. Nov. Hisp. 18. 1887.

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Barbs stout, all borne at the apex of the spine, in an umbrella-like whorl.
Upper petals, at least the middle one, with broad rounded blades.....8. K. bicolor.
Upper petals with narrow, linear or lanceolate blades.
Plants densely leafy, the branches not conspicuously spinose; fruit closely sericeous.....9. K. grayi.
Plants very sparsely leafy, the branches spinose; fruit with spreading or loosely ascending hairs.....10. K. paucifolia.
Barbs of the spines scattered along the upper part of the spine.
Body of the fruit strongly compressed.....11. K. parvifolia.
Body of the fruit very slightly or not at all compressed.
Body of the fruit 4 to 5 mm. thick, the spines short and stout. 12. K. revoluta.
Body of the fruit 6 to 7 mm. thick, the spines long and slender. 13. K. interior.

1. **Krameria cytisoides** Cav. Icon. Pl. 4: 61. *pl. 390.* 1797.
Krameria cinerea Schauer, Linnaea 20: 725. 1846.
Krameria ehrenbergii Gandog. Bull. Soc. Bot. France 60: 455. 1913.
Coahuila and Tamaulipas to Hidalgo and Puebla.
Erect shrub, 0.8 to 1.8 meters high; leaflets oblong-oblanceolate or obovate, 2 cm. long or shorter, sericeous; flowers purplish, the sepals about 2 cm. long. "Donapé."
Roots used for dyeing wool.

2. **Krameria palmeri** Rose, Contr. U. S. Nat. Herb. 1: 304. *pl. 27.* 1895.
Sinaloa and southern Sonora; type from Agiabampo, Sonora.
Dense shrub, 60 to 90 cm. high; leaves linear, 1 to 2 cm. long; fruit yellowish or purplish, about 8 mm. in diameter.

3. **Krameria cuspidata** Presl, Reliq. Haenk. 2: 103. 1836.
Tepic to Oaxaca.
Low shrub; flowers purplish, about 8 mm. long. "Viuxita" (Oaxaca).

4. **Krameria glandulosa** Rose & Painter, Contr. U. S. Nat. Herb. 10: 108. 1906.
Dry mesas and hillsides, Chihuahua to Baja California. Western Texas to Utah and California; type from El Paso, Texas.
Low, densely branched shrub; leaves sericeous, 1 to 2 cm. long; flowers rather showy, purplish, 6 to 8 mm. long.

5. **Krameria secundiflora** DC. Prodr. 1: 341. 1824.
Krameria pauciflora DC. Prodr. 1: 341. 1824.
Chihuahua and Coahuila to Oaxaca.
Plants woody only near the base and scarcely to be classed as shrubs; leaves linear or linear-lanceolate, 6 to 15 mm. long, acute; flowers yellowish, about 1 cm. long. "Zarzaparrilla" (San Luis Potsí); "raíz de cuculillo" (Jalisco).
The long black roots somewhat resemble those of the commercial sarsaparilla.

6. **Krameria prostrata** T. S. Brandeg. Zoe 5: 200. 1905.
Krameria diffusa Rose & Painter, Contr. U. S. Nat. Herb. 10: 107. 1906.
Sinaloa to Zacatecas, Morelos, and Guerrero; type from Cofradía, Sinaloa.
Similar in habit to the preceding species, but with purplish flowers, these 1 to 1.5 cm. long; leaves linear, 1 to 2 cm. long, acute, green.

7. **Krameria ramosissima** (A. Gray) S. Wats. Proc. Amer. Acad. 17: 326. 1882.
Krameria parvifolia ramosissima A. Gray, Pl. Wright. 1: 41. 1852.
Tamaulipas, and reported from Coahuila and Nuevo León. Western Texas (type locality).

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Densely branched shrub, 30 to 60 cm. high; leaves linear, 6 mm. long or shorter; flowers purplish. "Calderona" (Tamaulipas).

8. **Krameria bicolor** S. Wats. Proc. Amer. Acad. 21: 417. 1886.

Chihuahua to Sinaloa and Jalisco; type from Hacienda San José, Chihuahua.

Shrub, 0.9 to 1.5 meters high, with greenish stems; leaves lanceolate or linear, sericeous; flowers purplish; fruit about 1 cm. in diameter.

9. **Krameria grayi** Rose & Painter, Contr. U. S. Nat. Herb. 10: 108. 1906.

Krameria canescens A. Gray, Pl. Wright. 1: 42. 1852. Not *K. canescens* Willd. 1825.

Chihuahua and Coahuila. Western Texas (type locality) to southern California.

Densely branched shrub, 30 to 90 cm. high; leaves linear, densely sericeous; flowers purple. "Chacate" (*Ramírez*).

10. **Krameria paucifolia** Rose, Contr. U. S. Nat. Herb. 10: 108. 1906.

Krameria canescens paucifolia Rose, Contr. U. S. Nat. Herb. 1: 66. 1890.

Baja California and Sonora; type from La Paz, Baja California.

Low shrub, forming dense masses, the branches often spinose; leaves linear or lanceolate, 5 to 15 mm. long; flowers purplish, 6 to 8 mm. long. "Mezquitillo" (Baja California).

11. **Krameria parvifolia** Benth. Bot. Voy. Sulph. 6. *pl. 2.* 1844.

Baja California (type locality) and Sonora. Southern California and Arizona.

Low rigid shrub with gray or brownish branches; leaves linear, 1.5 cm. long or shorter; flowers purple.

The Pima Indians of Arizona use the powdered root in the treatment of sores.

12. **Krameria revoluta** Berg, Bot. Zeit. 1856: 751. 1856.

Krameria collina T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 182. 1915.

Oaxaca; type collected near Tehuantepec.

Low shrub; leaves linear, 1 to 2 cm. long. sericeous; flowers purple.

13. **Krameria interior** Rose & Painter, Contr. U. S. Nat. Herb. 10: 108. 1906.

Known only from the type locality, San Juan Capistrano, Zacatecas.

Low shrub with shredded bark and purple flowers.

65. MIMOSACEAE. Mimosa Family.

Trees or shrubs, often armed with spines; leaves usually bipinnate, rarely pinnate; flowers usually small but often showy, capitate, spicate, or racemose; calyx usually 5-lobed or 5-parted; petals usually 5, free or connate; fruit a legume, but very variable in form.

In many members of this family the leaves are "sensitive," that is, they respond when touched or struck by folding their leaflets together. They also often act in the same way upon the approach of darkness or during excessively dry weather. A few herbaceous representatives of the family occur in Mexico.

Leaves pinnate.....15. INGA.

Leaves bipinnate.

Anthers tipped with a small gland. Stamens usually twice as many as the corolla lobes; flowers spicate.

Fruit breaking up into 1-seeded joints. Plants scandent...1. ENTADA.

Fruit continuous, not breaking up into joints.

Fruit septate between the seeds, sometimes spirally coiled. 2. PROSOPIS.

Fruit not septate, never coiled.

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Plants unarmed, low shrubs or herbs. Fruit broadly oblong. **3. NEPTUNIA.**

Plants usually armed with spines, trees or large shrubs.

Fruit thin, bivalvate ---------- **4. PIPTADENIA.**

Fruit thick and hard, indehiscent ---------- **5. GOLDMANIA.**

Anthers without glands.

Stamens as many as the corolla lobes or twice as many.

Fruit with a persistent continuous margin, the valves separating from it; plants usually armed with spines; flowers capitate or spicate. **6. MIMOSA.**

Fruit without a persistent margin; plants unarmed; flowers capitate.

Seeds longitudinal or oblique; low shrubs or herbs ---------- **7. ACUAN.**

Seeds transverse; trees or large shrubs ---------- **8. LEUCAENA.**

Stamens more than twice as many as the corolla lobes.

Stamens free. Flowers capitate or spicate; plants spiny or unarmed. **9. ACACIA.**

Stamens united.

Fruit elastically bivalvate. Plants unarmed; flowers capitate. **10. CALLIANDRA.**

Fruit not elastically dehiscent.

Valves of the fruit separating from the persistent margin. Plants unarmed; flowers spicate or capitate ---------- **11. LYSILOMA.**

Valves of the fruit not separating from the margin.

Valves of the fruit thin, very broad, straight. Flowers capitate. **12. ALBIZZIA.**

Valves thickened, often curved, twisted, or coiled.

Fruit coiled, very broad, indehiscent; flowers capitate; plants unarmed ---------- **13. ENTEROLOBIUM.**

Fruit not coiled, usually narrow and indehiscent; flowers capitate or spicate; plants usually spiny. **14. PITHECOLLOBIUM.**

1. ENTADA Adans. Fam. Pl. 2: 318. 1763.

Scandent shrubs, often armed with spines; leaves bipinnate, the leaflets few, large; flowers small, spicate; fruit large, breaking up into 1-seeded joints.

Plants armed with very numerous recurved spines; fruit about 2 cm. wide. **1. E. patens.**

Plants unarmed; fruit 5 to 6 cm. wide ---------- **2. E. polystachia.**

1. Entada patens (Hook. & Arn.) Standl.

Inga patens Hook. & Arn. Bot. Beechey Voy. 419. 1841.

Piptadenia patens Benth. Bot. Voy. Sulph. 89. 1844.

Mimosa gualanensis Robins. & Bartl. Proc. Amer. Acad. 43: 53. 1907.

Guerrero. Guatemala and Nicaragua; type from Nicaragua.

Leaflets 3 to 6 pairs, 1.5 to 5 cm. long, oval or orbicular, nearly glabrous; flowers yellowish white; fruit about 13 cm. long, glabrous, often somewhat constricted between the seeds.

The Guerrero plant has more numerous pinnae and leaflets than the Central American one, and may be distinct.

2. Entada polystachia (L.) DC. Mém. Legum. 12. 1825.

Mimosa polystachia L. Sp. Pl. 520. 1753.

Sinaloa to Oaxaca and Tabasco. Central America, West Indies, and northern South America.

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Large scandent shrub; leaflets mostly oblong and 2 to 4 cm. long; flowers small, greenish, in dense spikes; fruit 5 to 6 cm. wide. "Bejuco de amole" (Guerrero, Tabasco); "bejuco de mondongo" (Tabasco, *Rovirosa*); "haba de la costa," "bejuco de panune," "bejuco de estribo" (Oaxaca, *Reko*); "bejuco de hierro" (Nicaragua); "guiamol" (El Salvador); "parra rosa" (Costa Rica); "bejuco de garza" (Colombia).

The tough stems are used as cordage. When macerated in water they are said to afford a substitute for soap. In Trinidad the roots are employed as a remedy for venereal diseases.

Entada scandens (L.) Benth. is reported from Tabasco, where it is said to be known as "haba," "haba de la costa," and "tacalote." The writer has seen no Mexican specimens, and it may be that the plant so referred to is really *E. polystachia*. *E. scandens* is distinguished by its much larger fruit and enormous seeds (these 5 to 6 cm. broad).

2. PROSOPIS L. Mant. Pl. 1: 10. 1767.

Spiny shrubs or trees; leaves bipinnate, the pinnae usually 1 or 2 pairs, the leaflets small and numerous; flowers small, spicate or capitate; fruit indehiscent, linear, sometimes constricted between the seeds, in some species spirally coiled.

The first two species, with spirally coiled fruit, are sometimes referred to a separate genus, *Strombocarpa*.

Fruit spirally coiled; flowers spicate or capitate.
- Flowers capitate ..... 1. P. cinerascens.
- Flowers spicate ..... 2. P. pubescens.

Fruit not coiled; flowers spicate.
- Corolla dentate; fruit 7.5 cm. long or shorter ..... 3. P. palmeri.
- Corolla deeply lobate; fruit usually much longer.
  - Leaflets commonly rounded at apex, broad in proportion to their length.
    - Leaflets glabrous, often ciliolate; fruit usually glabrous ..... 4. P. juliflora.
    - Leaflets puberulent; fruit usually puberulent ..... 4a. P. juliflora velutina.
  - Leaflets usually acutish at apex, linear, often very long. 4b. P. juliflora glandulosa.

1. **Prosopis cinerascens** A. Gray; Benth. Trans. Linn. Soc. Bot. 30: 381. 1875.
Strombocarpa cinerascens A. Gray, Pl. Wright. 1: 61. 1852.

Tamaulipas and Nuevo León; type from Azulfrora, Nuevo León. Southwestern Texas.

Shrub, about 30 cm. high, armed with long slender spines, pubescent; leaflets 8 to 12 pairs, oblong, 1.5 to 3 mm. long; fruit 1.5 to 4 cm. long.

2. **Prosopis pubescens** Benth. Lond. Journ. Bot. 5: 82. 1846.
Strombocarpa pubescens A. Gray, Pl. Wright, 1: 60. 1852.

Northern Baja California, Sonora, and Chihuahua, chiefly in alluvial soil of river valleys. Southern California to western Texas; type from California.

Shrub or tree, sometimes 10 meters high, with a trunk 30 cm. in diameter, the bark brownish, separating into thin flakes; spines stout, whitish; leaves deciduous, the leaflets 1 cm. long or shorter, pubescent; flowers greenish, the spikes 5 to 8 cm. long; fruit 3 to 5 cm. long, yellowish; wood very hard, brittle, close-grained, light brown, its specific gravity about 0.76. Known generally as "tornillo."

The screwpod mesquite is often abundant in river valleys, forming dense thickets of considerable extent. The wood is very durable and is used for fence posts, tool handles, etc., and in the Rio Grande Valley it is an important source of fuel. The fruits are edible like those of *P. juliflora*, and are used in

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much the same way. They are so sweet that they can be eaten as picked, without any special preparation. The Indians of the Colorado River region obtained a fermented drink from the pods, and by boiling them they prepared a sirup. The Pimas of Arizona cooked the poods in a pit lined with the stems of *Tessaria borealis*, alternating them with layers of cocklebur (*Xanthium* sp.) leaves. The pit was covered with earth and left three or four days before being opened. The pods were then spread in the sun, dried, and stored. Later they were pounded into a fine flour, which was eaten in the form of pinole. The Pimas also used a decoction of the root bark as a dressing for wounds, and as the wound healed the dried and pulverized bark was substituted.

3. **Prosopis palmeri** S. Wats. Proc. Amer. Acad. **24**: 48. 1889.

Baja California; type from Mulegé.

Shrub or tree, sometimes 7.5 meters high, with spreading crown; bark rough, splitting off in long strips; leaflets 4 to 7 mm. long; flowers bright yellow, fragrant; fruit almost terete at maturity, puberulent. "Palo de hierro."

4. **Prosopis juliflora** (Swartz) DC. Prodr. **2**: 447. 1825.

Mimosa juliflora Swartz. Prodr. Veg. Ind. Occ. 85. 1788.

Mimosa rotundata Sessé & Moc. Pl. Nov. Hisp. 178. 1887.

Nearly throughout Mexico. West Indies, the type from Jamaica; Central America; widely distributed in South America; naturalized in Hawaii and the Philippine Islands.

Shrub or tree, sometimes 12 meters high with a trunk 1.2 meters in diameter, the bark thick, brown or blackish, shallowly fissured; leaflets mostly 5 to 10 mm. long, linear-oblong; flowers greenish yellow, sweet-scented; fruit mostly 10 to 20 cm. long, about 1 cm. wide, strongly compressed when young but thick at maturity, brown or yellowish; wood hard, close-grained, dark red or brown, with yellow sapwood, its specific gravity about 0.76. Known generally as "mezquite" (from the Nahuatl "mizquitl"), but the following additional names are reported: "Guisache" (Michoacán, Guerrero); "chúcata," (Michoacán, Tarascan); "tziritzequa" (Michoacán, *Ramirez*); "algarroba" (Colima, and in many other regions); "mezquite blanco," "mezquite amarillo," "mezquite colorado," "chachaca" (*Alcocer*); "manca-caballo" (Panama); "acacia de Catarina" (Nicaragua); "aroma" (Philippines); "mezquite chino" (Tamaulipas); "mezquicopal" (the gum, *Robelo*, from the Nahuatl *mizqui-copalli*); "ttâhî" (Otomí, *Buelna*).

One of the best-known plants of Mexico and of the arid regions of the United States; in Mexico often planted as a shade tree. In the more arid regions the mesquite is usually a shrub, and it is only when fairly well supplied with water that it becomes a tree. It thrives best in river valleys, where it attains the greatest size, but on plains and mesas it is often abundant, frequently, indeed, being the most characteristic plant for many miles, and forming thickets or forests. The smaller trees are strikingly suggestive of peach trees, for which they are often mistaken by inexperienced eastern travellers viewing them for the first time from the train as they cross the State of Texas. The larger individuals are much like apple trees in habit. The wood is valuable for many purposes, such as railroad ties, carts, fence posts, charcoal, fuel, etc. In Texas it has been used for paving blocks for streets. The wood and bark are employed for tanning. In the northern part of its range the shrubby form develops enormous underground stems (known in Chihuahua as "cepas") which, in many places are the most important source of fuel. They require a great amount of labor to remove them from the earth, but they form excellent firewood. The smaller roots penetrate the soil to a great depth, sometimes, it is said, for as much as 15

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to 23 meters. The Seri Indians of Tiburón Island use the root fiber for cordage, wetting the roots in water, and sometimes they manufacture a coarse fabric from the fiber. The wood of the roots is very hard, and the Pima of Arizona employed it for their war clubs and for plows.

The gum which exudes from the trunk ("goma de mezquite," "goma del país," "mizquicopalli") is amber-colored and translucent, similar to gum arabic, for which it is often substituted in Mexico. Dissolved in water it makes excellent mucilage, and its infusion is used for dysentery and as a gargle for throat affections; by the Pimas a solution of it was used for treating sore eyes and open wounds. It is sometimes employed in making candy. The flowers are much frequented by bees, and yield a good grade of light-colored honey. The Pima Indians sometimes eat the flower spikes, stripping off the flowers between the teeth. The same tribe employs the inner bark of the mesquite as a substitute for rennet, and a decoction of it as an emetic and cathartic.

The pods are, perhaps, the most important part of the plant. When chewed they are sweet, for they contain much sugar, the pulp being composed of 25 to 30 per cent of grape sugar. They are eaten by stock of all kinds and where the plants are abundant are important for forage. In Hawaii, where the mesquite is naturalized, the fruits have become an article of some commercial importance because of their use for stock feed. They are gathered in large quantities and ground into meal. It is of interest to note that in the early days of the Spanish occupation, when ships traded regularly every year between Acapulco and Manila, the mesquite was introduced into the Philippines and has now become naturalized there. It was even described from that country as a new species, *Prosopis vidaliana* Naves. The pods have long been an article of human food in North America, and are still so used to some extent, especially by the Indians. Among some of the tribes, as with the Pimas, they were the chief food staple. They are ground into a meal from which the seeds and coarser parts of the pods are removed. The Apaches and other tribes often made use of holes or depressions in the rocks as a mortar for grinding the pods, and these holes are now of common occurrence in the mountains where mesquite plants are found. The meal is made into cakes (known in Mexico as "mezquitamales") which are baked, or it is mixed with water to form a beverage known as "mezquitatole." The meal is also mixed with water and fermented to make a kind of beer.

The mesquite is discussed by Sahagún under the name "mizquitl." "From the bark," he writes, "they prepare a drink which takes the place of *pulque*," a statement whose accuracy is questionable. He reports that the juice of the leaves and young shoots is dropped into the eyes to relieve affections of those organs. Hernández[1] also treats of the plant in a chapter entitled "De *Mizquitl*, seu Siliqua Acatiae." He states that the Chichimec Indians make cakes from the pods, and, incorrectly of course, that the tree "is the true Acacia of the ancients, which furnishes Gum Arabic." The tree is mentioned also by Clavigero (Historia de California, 1789), who says, but doubtless erroneously, that it is introduced in that region. He also mentions the use of the juice for the relief of eye affections (a practice still followed in Mexico to the present day), and he reports that the Cochimí name of the plant is "guatrá."

Prosopis juliflora is a variable species, but there seems to be no satisfactory basis for separation of the forms. Some of the Mexican material exactly matches that from Jamaica, but many specimens approach the two following forms. It may be mentioned, incidentally, that the early writers state that the mesquite of Jamaica is not a native plant, but was introduced in early days, very probably from Mexico.

[1] Thesaurus 59. 1651. A figure is given on page 455.

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Berlandier[1] once applied (but without technical description) the name *Mimosa "pseudo-echinus"* to this species, because of the resemblance of the leaves to those of "*Echinus Molle*," the "árbol del Perú." The latter Latin name, of course, is a typographical (?) error for *Schinus molle*.

4a. Prosopis juliflora velutina (Wooton) Sarg. Silv. N. Amer. **13**: 15. 1902.

Prosopis odorata Torr. in Frém. Rep. Exped. Rocky Mount. 313. 1843.

Prosopis articulata S. Wats. Proc. Amer. Acad. **24**: 48. 1889.

Prosopis velutina Wooton, Bull. Torrey Club **25**: 456. 1898.

Sonora and Baja California to Michoacán. Arizona (type locality).

Shrub or often a tree, 2 to 6 meters high or larger. "Mezquite."

This form is usually distinguishable from the typical *juliflora* by the small pubescent leaflets. There are so many intermediate specimens, however, especially in Mexico, that it is not possible to recognize the form as a species. In case the plant should receive such recognition, the proper name for it is *Prosopis odorata* Torr. That name was based upon a flowering specimen of the present plant and fruit of *P. pubescens*, and for that reason has been discarded by most writers. Taking into consideration the specific name, "*odorata*," it seems reasonable to typify the name by the flowering specimen.

Prosopis articulata was based upon a form in which the pods are strongly constricted between the seeds. Specimens examined show great variation in this respect, the prominence of the constrictions being dependent, apparently, upon the amount of fleshy matter developed in the valves.

4b. Prosopis juliflora glandulosa (Torr.) Cockerell, N. Mex. Agr. Expt. Sta. Bull. **15**: 58. 1895.

Prosopis glandulosa Torr. Ann. Lyc. N. Y. **2**: 192. 1828.

Baja California to Tamaulipas, Veracruz, and Yucatán. Louisiana to southern California; type from New Mexico.

Shrub or tree, either with a well developed trunk or without one. "Mezquite."

If the material from the West Indies and the United States were studied without reference to that from Mexico, as has been done, apparently, by recent writers, *Prosopis glandulosa* might well be considered a distinct species. In Mexico so many intergrading plants occur that it can not be regarded as more than a form of *P. juliflora*. The leaflets are usually glabrous, but often they are quite as pubescent as in *P. juliflora velutina*. Specimens from Peru and Argentina are so like the plant of the United States that if they were labeled as coming from the latter country no one would question their determination as *P. glandulosa*.

3. NEPTUNIA Lour. Fl. Cochinch. 653. 1790.

Low shrubs or herbs, unarmed; leaves bipinnate, the leaflets small, numerous, the stipules persistent; flowers small, capitate or in short oblong spikes; fruit short and broad, flat.

Neptunia oleracea Lour., an aquatic herbaceous species, has been collected in Tabasco.

Fruit about 15 mm. wide; plants pubescent ..... 1. N. pubescens.
Fruit 8 mm. wide or narrower; plants glabrous ..... 2. N. plena.

1. Neptunia pubescens Benth. in Hook. Journ. Bot. **4**: 356. 1842.

Coahuila. Western Texas; South America, the type from Peru.

Low suffrutescent plant; pinnae 2 or 3 pairs, the leaflets 15 to 35 pairs, oblong, about 6 mm. long; fruit 2 to 2.5 cm. long.

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[1] Diario de viage de la Comissión de Límites, p. 177. 1850.

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2. Neptunia plena (L.) Benth. in Hook. Journ. Bot. **4**: 355. 1842.

Mimosa plena L. Sp. Pl. 519. 1753.

Baja California and Sinaloa to Chiapas. Widely distributed in tropical America.

Low shrub or often herbaceous; pinnae 3 to 5 pairs, the leaflets 5 to 8 mm. long; flowers yellow, capitate, the heads long-pedunculate; fruit 3 to 4.5 cm. long.

4. PIPTADENIA Benth. in Hook. Journ. Bot. 4: 334. 1842.

Erect or scandent shrubs or trees, armed or unarmed; leaves bipinnate, the leaflets few or numerous; flowers small, spicate.

Piptadenia cebil Griseb. of Argentina is valued as a source of tanbark. *P. rigida* Benth. of Brazil furnishes Angico gum, which resembles gum arabic. From the seeds of *P. peregrina* (L.) Benth., a species occurring in the West Indies and South America, the natives prepared a narcotic snuff known in the West Indies as "cohoba."[1] That species is known in Porto Rico as "cojoba," "cojóbana," "cojobo," and "cojobillo."

Leaflets linear, about 1 mm. wide; fruit not constricted.....1. **P. flava.**
Leaflets oval or rhombic, 3 to 10 mm. wide; fruit constricted between the seeds. 2. **P. constricta.**

1. Piptadenia flava (Spreng.) Benth. Trans. Linn. Soc. Bot. **30**: 371. 1875.

Acacia flava Spreng. Syst. Veg. **3**: 141. 1826.

Piptadenia leptocarpa Rose, Contr. U. S. Nat. Herb. **1**: 325. 1895.

Mimosa buceragenia Robinson, Proc. Amer. Acad. **43**: 23. 1907.

Jalisco to Guerrero. Central America and northern South America; type from Colombia.

Erect shrub, 3 to 5 meters high; leaflets 4 to 7 mm. long, glabrous; flowers yellowish green; fruit flat, 3 to 8 cm. long, about 1.5 cm. wide, glabrous.

2. Piptadenia constricta (Mich. & Rose) Macbride, Contr. Gray Herb. n. ser. **59**: 18. 1919.

Goldmannia constricta Mich. & Rose, Mém. Soc. Phys. Hist. Nat. Genève **34**: 274. *pl. 20.* 1903.

Sinaloa to Guerrero; type from Acapulco, Guerrero.

Tree, 10 to 12 meters high, unarmed or with short stout spines; pinnae about 5 pairs, the leaflets rhombic, 6 to 17 mm. long; fruit 10 to 15 cm. long, about 6 mm. wide, very deeply constricted between the seeds.

5. GOLDMANIA Rose; Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 274. 1903.

1. Goldmania foetida (Jacq.) Standl.

Mimosa foetida Jacq. Pl. Hort. Schönbr. **3**: 73. *pl. 390.* 1798.

Piptadenia foetida Benth. Trans. Linn. Soc. Bot. **30**: 366. 1875.

Goldmania platycarpa Rose; Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 274. 1903.

Piptadenia platycarpa Macbride, Contr. Gray Herb. n. ser. **59**: 18. 1919.

Sinaloa to Puebla; described from cultivated plants whose origin was doubtful.

Tree, sometimes 12 meters high, or only a shrub, unarmed; leaflets suborbicular to cuneate-obovate, 1 to 3 cm. long, nearly glabrous; flowers yellowish green, spicate, ill-scented; fruit short, 1 to 1.5 cm. wide, curved, reddish brown, rough.

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[1] See W. E. Safford, Narcotic plants and stimulants of the ancient Americans, Ann. Rep. Smiths. Inst. **1916**: 387–424. *pl. 1–17, f. 1–6.* 1917.

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"Pinzanguarimbo" (Guerrero); "coyacate" (Guerrero, *Bonpland*); "huizache" (Guerrero, Jalisco, *Urbina*); "yóndiro" (Michoacán, *Ramírez*); "cusa" (Sinaloa).

This has been reported from Mexico as *Piptadenia quadrifolia* N. E. Brown, a South American species.

6. MIMOSA L. Sp. Pl. 516. 1753.

REFERENCE: Robinson, Proc. Amer. Acad. 33: 305–331. 1898.

Trees or shrubs, usually armed with stout spines, occasionally scandent; leaves bipinnate; petiolar glands commonly absent; flowers small but often bright-colored, capitate or spicate. sessile; stamens usually long-exserted; fruit very variable in form, usually compressed, the margin persistent, the valves often breaking into joints.

Several herbaceous species occur in Mexico. A large number of Mexican species are described by Sessé and Mociño,[1] but in most cases it is impossible to identify them.

A. Flowers spicate.
- Leaflets 1 or 2 pairs.
  - Leaflets densely pubescent; fruit coiled ..... **1. M. spirocarpa.**
  - Leaflets glabrous; fruit straight.
    - Leaflets 15 to 22 mm. long ..... **2. M. rosei.**
    - Leaflets 4 to 9 mm. long ..... **3. M. paucifoliolata.**
- Leaflets more than 2 pairs, at least in most of the leaves, usually much more numerous.
  - Corolla glabrous or nearly so.
    - Leaflets few, 1 to 5 or rarely 7 pairs, elliptic to obovate, less than twice as long as broad.
      - Leaflets and fruit glabrous ..... **4. M. laxiflora.**
      - Leaflets and fruit pubescent.
        - Fruit armed with spines ..... **5. M. distachya.**
        - Fruit unarmed ..... **6. M. purpurascens.**
    - Leaflets 4 to 20 pairs or more, linear or oblong, more than twice as long as broad.
      - Fruit sessile or nearly so ..... **7. M. polyantha.**
      - Fruit long-stipitate.
        - Valves of the fruit hispid ..... **8. M. polyanthoides.**
        - Valves of the fruit glabrous.
          - Joints of the fruit much broader than long; filaments yellowish. **9. M. stipitata.**
          - Joints of the fruit about as long as broad; filaments purplish. **10. M. ionema.**
  - Corolla densely sericeous or puberulent.
    - Leaflets 4 to 10 mm. wide ..... **11. M. guatemalensis.**
    - Leaflets 2.5 mm. wide or narrower.
      - Stems unarmed ..... **12. M. puberula.**
      - Stems armed with stout spines.
        - Leaflets usually 20 to 40 pairs ..... **13. M. cabrera.**
        - Leaflets usually less than 20 pairs.
          - Spikes oblong, little longer than broad ..... **56. M. monancistra.**
          - Spikes cylindric, much longer than broad.
            - Branches covered with minute, sessile or stipitate glands. **14. M. adenantheroides.**

[1] Pl. Nov. Hisp. 175–179. 1887.

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Branches not glandular.
Calyx distinctly dentate, 1 to 1.5 mm. long, a third to half as long as the corolla.
Fruit about 4 mm. wide, unarmed.....15. **M. coelocarpa.**
Fruit about 6 mm. wide, often spiny.
Spines dark-colored, not much broadened at the base; fruit unarmed.....16. **M. wrightii.**
Spines usually light-colored, very broad and flat at base; fruit armed with spines on the margins. 17. **M. dysocarpa.**
Calyx subtruncate, about 0.8 mm. long, about a fourth as long as the corolla.
Pinnae 3 or 4 pairs.....18. **M. luisana.**
Pinnae 9 to 20 pairs.
Leaflets glabrous on the upper surface. 19. **M. rhododactyla.**
Leaflets tomentulose-sericeous on both surfaces.
Fruit unarmed or nearly so.....20. **M. palmeri.**
Fruit densely armed with spines.....21. **M. benthami.**

AA. Flowers capitate.
B. Stamens of the same number as the corolla lobes.
Pinnae one pair; leaflets 1 or 2 pairs, usually large.
Stems copiously pubescent or setose.....22. **M. albida.**
Stems glabrous or nearly so.
Plants unarmed or nearly so; leaflets 1.7 cm. long or shorter. 23. **M. goldmanii.**
Plants armed with spines; leaflets mostly 2.5 to 8 cm. long.
Pods sessile or nearly so; leaflets setose beneath. 24. **M. manzanilloana.**
Pods stipitate; leaflets glabrous beneath.....25. **M. acapulcensis.**
Pinnae usually 2 to several pairs, sometimes one pair; leaflets 3 to many pairs, usually small.
Pinnae 3 to 5 pairs.....26. **M. leptocarpa.**
Pinnae 1 or 2 pairs. Fruit (so far as known) less than 1 cm. wide.
Leaflets 3 to 5 or rarely 6 pairs, 7 to 25 mm. wide.
Leaflets 2 cm. long or shorter, glabrous.....27. **M. lactiflua.**
Leaflets 2.3 to 3.6 cm. long, more or less pubescent.
Fruit strigose; leaflets strigose.....28. **M. deamii.**
Fruit glabrous; leaflets soft-pubescent when young. 29. **M. psilocarpa.**
Leaflets more than 5 pairs in most of the leaves, less than 7 mm. wide.
Peduncles glabrous or merely puberulent.
Fruit densely spiny.....30. **M. sicyocarpa.**
Fruit unarmed, except sometimes on the margin.
Plants unarmed; margin of the fruit spiny.....31. **M. caerulea.**
Plants armed with stout spines; fruit unarmed. 32. **M. mixtecana.**
Peduncles densely pilose, tomentose, scabrous, or hispid.
Fruit glabrous but spiny; plants chiefly herbaceous. 34. **M. pudica.**
Fruit puberulent or pilose as well as spiny; plants woody almost throughout.
Leaflets glabrous on the upper surface.....34. **M. nelsonii.**
Leaflets densely pubescent on both surfaces.....35. **M. xanti.**

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BB. Stamens twice as many as the corolla lobes.
Branches more or less bristly-hispid, usually armed with spines also, in one species the pubescence only obscurely hispid, but the spines then tipped with flexuous bristles.
Stems bristly but without spines.....36. M. camporum.
Stems armed with spines.
Rachis of the leaf bristly but without spines; pinnae 20 to 25 pairs. 37. M. galeottii.
Rachis of the leaf armed with spines.
Bristles of the peduncles usually gland-tipped; corolla striate. 38. M. somnians.
Bristles of the peduncles eglandular; corolla not striate.
Pods obovate, 1 to 3-seeded; spines with slender flexuous tips. 39. M. dormiens.
Pods linear-oblong, 15 to 20-seeded; spines stiff, straight. 40. M. pigra.
Branches not bristly-hispid; spines never ending in flexuous bristles.
C. Corolla glabrous.
Fruit winged; peduncles rufous-tomentose. Leaflets 2 to 3 mm. wide. 41. M. hemiendyta.
Fruit not winged; peduncles not rufous-tomentose.
Leaflets 3 to 17 mm. wide or broader.
Plants unarmed; leaflets coriaceous, 6 to 17 mm. wide. 43. M. leucaenoides.
Plants armed with spines; leaflets thin, mostly 3 to 8 mm. wide.
Leaflets glabrous.
Pinnae one pair; leaflets about 8 pairs.....44. M. micheliana.
Pinnae 3 or 4 pairs; leaflets 4 or 5 pairs...53. M. wootonii.
Leaflets pubescent. Pinnae 3 or more pairs.
Leaflets rhombic, acute or acutish, mostly 5 to 8 mm. wide, soft-pilose beneath when young; branches pilose. 45. M. ervendbergii.
Leaflets oblong, rounded at the apex, 3 to 4 mm. wide, minutely strigillose; branches puberulent or glabrate. 46. M. argillotropha.
Leaflets 2 mm. wide or narrower.
Pinnae 1 to 3 pairs; leaflets few, usually 5 pairs or fewer.
Spines geminate.....47. M. tenuiflora.
Spines solitary.....58. M. lindheimeri.
Pinnae 3 to many pairs; leaflets numerous.
Petioles equaling or longer than the rachis, densely armed with short recurved spines.....48. M. invisa.
Petioles much shorter than the rachis, unarmed or with a few scattered spines.
Leaflets 8 pairs or fewer; fruit about 6 mm. wide. 49. M. grahami.
Leaflets 20 to 32 pairs, thin; fruit often 2 cm. wide.
Pinnae 6 to 12 pairs.....50. M. eurycarpa.
Pinnae 15 to 18 pairs.....51. M. colimensis.
CC. Corolla pubescent, at least on the lobes.
Leaflets 4 to 6 mm. wide.....52. M. malacophylla.
Leaflets less than 3 mm. wide.
Fruit with 2 broad lacerate wings.....42. M. lacerata.
Fruit not winged.

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D. Pinnae 1 to 4 pairs.
Leaflets one pair ..... **54. M. zygophylla.**
Leaflets 2 or more pairs.
Valves of the fruit armed with spines.
Rachis of the leaf armed with numerous spines. **55. M. hystricosa.**
Rachis of the leaf unarmed.
Leaflets green, thinly sericeous ..... **56. M. monancistra.**
Leaflets white with a dense sericeous pubescence. **57. M. emoryana.**
Valves of the fruit unarmed, the margins often spiny.
Corolla nearly glabrous ..... **58. M. lindheimeri.**
Corolla densely pubescent.
Spines straight; leaflets densely sericeous with long soft hairs ..... **59. M. purpusii.**
Spines recurved; leaflets strigillose or sericeous with very short hairs.
Pinnae 3 or 4 pairs ..... **65. M. biuncifera.**
Pinnae 1 or 2 pairs.
Fruit glabrate, acute at the base ..... **60. M. pringlei.**
Fruit densely tomentose, rounded at the base.
Fruit strongly constricted between the seeds, the margins with numerous long spines. **61. M. depauperata.**
Fruit scarcely at all constricted, the margins unarmed or nearly so ..... **62. M. calcicola.**
DD. Pinnae more than 4 pairs in all or most of the leaves.
Leaflets about 1 mm. long. Valves of the fruit very spiny. **63. M. minutifolia.**
Leaflets 2 mm. long or longer.
Leaflets 2.5 to 3 mm. wide, densely pilose-sericeous on both surfaces ..... **64. M. mollis.**
Leaflets mostly less than 2 mm. wide.
Fruit acute or acutish at base and usually also at apex, 4 to 6 mm. wide ..... **65. M. biuncifera.**
Fruit rounded or very obtuse at base and apex, 7 to 10 mm. wide.
Leaflets 5 to 7 mm. long ..... **66. M. lemmoni.**
Leaflets 4 to 5 mm. long ..... **67. M. aculeaticarpa.**

1. **Mimosa spirocarpa** Rose, Contr. U. S. Nat. Herb. **3**: 316. *pl. 11.* 1895.

Sinaloa to Colima; type from Culiacán, Sinaloa.

Shrub, 3 to 6 meters high; leaflets obliquely oval or suborbicular, 1 to 3 cm. long; flowers purplish at first, becoming white, the spikes 7 to 13 cm. long; fruit narrow, coiled like a snail shell.

2. **Mimosa rosei** Robinson, Proc. Amer. Acad. **33**: 317. 1898.

Known only from the type locality, Bolaños, Jalisco.

Plant unarmed, so far as specimens show; leaflets obliquely obovate or oval; fruit pale green, about 7 cm. long and 7 mm. wide, glabrous, unarmed, long-stipitate.

3. **Mimosa paucifoliolata** Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 278. *pl. 24.* 1903.

Mimosa laxiflora zygophylloides Robinson, Proc. Amer. Acad. **33**: 317. 1898.

Colima and Michoacán or Guerrero; type from Las Minitas.

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Shrub or small tree, 2 to 5 meters high, sparsely armed with flat straight spines; leaflets obovate-orbicular; flowers white, the spikes 3 to 4 cm. long, lax.

4. **Mimosa laxiflora** Benth. Lond. Journ. Bot. 5: 93. 1846.

? *Acacia prosopoides* DC. Prodr. 2: 460. 1825.

Chihuahua and Sonora (type locality).

Shrub with few short spines; leaflets 5 to 12 mm. long, pale green; flowers white, the spikes 2 to 4 cm. long; fruit unarmed.

5. **Mimosa distachya** Cav. Icon. Pl. 3: 48. *pl. 295.* 1794.

Mimosa brandegei Robinson, Proc. Amer. Acad. 33: 316. 1898.

Baja California and Sinaloa to Oaxaca and Puebla.

Shrub, copiously armed with short recurved spines; leaflets 4 to 18 mm. long, pale green; flowers white or pinkish, the spikes long and lax; fruit usually setose, 6 to 8 mm. wide. "Garabatillo" (Oaxaca).

It is possible that *M. brandegei* is a distinct species, but the material at hand can not be separated consistently into two forms.

6. **Mimosa purpurascens** Robinson, Proc. Amer. Acad. 33: 317. 1898.

Baja California, Sonora, and Sinaloa; type from La Paz, Baja California.

Shrub or small tree, 2 to 10 meters high; leaflets 3 to 8 mm. long; flowers pink; fruit puberulent, unarmed. "Cuca," "cuilón," "iguano" (Sinaloa).

In Sinaloa the bark is used for tanning skins, and it is sometimes chewed to harden the gums.

7. **Mimosa polyantha** Benth. in Hook. Journ. Bot. 4: 410. 1842.

Mimosa polyantha levior Robinson, Proc. Amer. Acad. 33: 318. 1898.

Sinaloa to Morelos and Oaxaca; type from Acatlán, Puebla. Guatemala.

Shrub, 1 to 3.5 meters high, copiously armed with spines; leaflets 2 to 4 mm. long; flowers pink or white, the spikes long and lax; fruit usually hispid, sometimes smooth, about 8 mm. wide. "Arrendador" (Sinaloa).

8. **Mimosa polyanthoides** Robinson, Proc. Bost. Soc. Nat. Hist. 31: 260. 1904.

Guerrero; type from mountains above Iguala, altitude 1,200 meters.

Shrub, 3 to 4.5 meters high; leaflets 5 to 7 mm. long.

9. **Mimosa stipitata** Robinson, Proc. Bost. Soc. Nat. Hist. 31: 261. 1904.

Guerrero, Oaxaca, Puebla, and Morelos; type from Iguala, Guerrero, altitude 1,200 meters.

Shrub or small tree, 1.5 to 4.5 meters high; leaflets 3 to 5 mm. long; flowers white, the spikes 2.5 to 4.5 cm. long, lax; fruit about 4.5 cm. long and 1 cm. wide, glabrous. "Timbin" (Michoacán, Guerrero).

Bark used for tanning.

10. **Mimosa ionema** Robinson, Proc. Amer. Acad. 36: 473. 1901.

Guerrero and Morelos; type from Cuernavaca.

Shrub, 3 to 4.5 meters high, armed with straight flat spines; leaflets 5 to 9 mm. long; flowers pinkish.

Doubtfully distinct from *M. stipitata.*

11. **Mimosa guatemalensis** (Hook. & Arn.) Benth. Bot. Voy. Sulph. 89. 1844.

Inga guatemalensis Hook. & Arn. Bot. Beechey Voy. 419. 1841.

Sinaloa and Tepic. Guatemala (type locality) and Nicaragua.

Shrub, about 2 meters high, densely pubescent, armed with numerous short straight spines; leaflets oval or obovate-oval, 7 to 20 mm. long; fruit densely pubescent, unarmed, about 6 mm. wide.

12. **Mimosa puberula** Benth. Lond. Journ. Bot. 5: 88. 1846.

Hidalgo and perhaps elsewhere; type from Zimapán.

Pinnae 5 to 10 pairs, the leaflets oblong, 4 to 5 mm. long; spikes 4 to 5 cm. long; fruit pubescent.

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13. **Mimosa cabrera** Karst. Fl. Columb. 2: 63. *pl. 132.* 1869.

Chiapas. Central America and Colombia (type locality).

Small tree, armed with very stout flat spines; leaflets about 5 mm. long, linear-oblong; fruit pubescent. "Tepescahuite" (Chiapas, *Seler*); "carbón," "carbonal" (Honduras); "carbonal" (Colombia); "cabrero" (Venezuela).

14. **Mimosa adenantheroides** (Mart. & Gal.) Benth. Lond. Journ. Bot. 5: 88. 1846.

Acacia adenantheroides Mart. & Gal. Bull. Acad. Brux. 10[2]: 310. 1843.

Guerrero and Oaxaca; type from mountains of Sola and Yolotepeque, Oaxaca.

Erect shrub, armed with stout flat spines; leaflets oblong, 3 to 13 mm. long; spikes 1.5 to 2 cm. long; fruit 6 to 7 mm. wide, puberulent.

15. **Mimosa coelocarpa** Robinson, Proc. Amer. Acad. 33: 319. 1898.

Known only from the type locality, Topolobampo, Sinaloa.

Very spiny shrub; leaflets about 3 mm. long; spikes 3 to 4 cm. long; fruit densely pubescent.

16. **Mimosa wrightii** A. Gray, Pl. Wright. 2: 52. 1853.

Chihuahua and Sonora (type locality). Southern Arizona.

Shrub, armed with straight flat spines; leaflets 3 to 5 mm. long, obtuse or acute; flowers pink; fruit densely pubescent, unarmed.

17. **Mimosa dysocarpa** Benth.; A. Gray, Pl. Wright. 1: 62. 1852.

Chihuahua, Sonora, and Durango. Western Texas (type locality) to southern Arizona.

Densely armed shrub; leaflets 3 to 6 mm. long, pubescent; flowers pink, sweet-scented; fruit armed on the margins with short stout spines, densely pubescent. "Gatuño" (Chihuahua).

18. **Mimosa luisana** T. S. Brandeg. Zoe 5: 248. 1908.

Puebla and Oaxaca; type from San Luis Tultitlanapa, Puebla.

Shrub, armed with straight flat spines; leaflets 3 to 4 mm. long, pubescent; flowers pink, the spikes about 3.5 cm. long; fruit densely pubescent, unarmed, about 5 mm. wide.

19. **Mimosa rhododactyla** Robinson, Proc. Bost. Soc. Nat. Hist. 31: 260. 1904.

Known only from the type locality, Las Higueritas, near the boundary between Michoacán and Guerrero, altitude 500 meters.

Shrub, 3 meters high; leaflets 3 mm. long, pubescent; flowers pale pink.

20. **Mimosa palmeri** Rose, Contr. U. S. Nat. Herb. 1: 99. 1891.

Mimosa fasciculata malacocarpa Robinson, Proc. Amer. Acad. 33: 319. 1898.

Sonora, Sinaloa, and Jalisco; type from Alamos, Sonora.

Shrub, 1.8 to 3 meters high, armed with stout straight spines; leaflets 2 to 4 mm. long; flowers pink, fragrant, the spikes 4 to 6 cm. long; fruit long, narrow, unarmed, about 3 mm. wide.

21. **Mimosa benthami** Macbride, Contr. Gray Herb. n. ser. 59: 12. 1919.

Acacia fasciculata Kunth, Mimos. Pl. Légum. 75. *pl. 23.* 1819–24.

Mimosa fasciculata Benth. Lond. Journ. Bot. 5: 88. 1846. Not *M. fasciculata* Benth. 1842.

Durango to Jalisco, Oaxaca, and Morelos; type from Guanajuato.

Shrub, armed with stout straight spines; leaflets 2 to 6 mm. long; bark whitish; flowers pinkish, the spikes long and dense; fruit densely spiny, about 5 mm. wide. "Uña de gato" (Jalisco, Michoacán, Guerrero).

22. **Mimosa albida** Humb. & Bonpl.; Willd. Sp. Pl. 4: 1030. 1805.

Mimosa floribunda Willd. Sp. Pl. 4: 1031. 1805.

Mimosa albida floribunda Robinson, Proc. Amer. Acad. 33: 311. 1898.

Mimosa albida euryphylla Robinson, Proc. Amer. Acad. 33: 311. 1898.

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Sinaloa to San Luis Potosí, Tabasco, and Chiapas. Central America and South America; type from Peru.

Shrub, 1 to 3 meters high, armed with short recurved spines; leaflets oblique, 3 to 8 cm. long, usually obtuse, densely pubescent; flowers pinkish; fruit 2 to 3 cm. long, 5 mm. wide, setose-hispid. "Sensitiva," "vergonzoso" (Oaxaca).

23. **Mimosa goldmanii** Robinson, Proc. Amer. Acad. **33**: 308. 1898.

Known only from the type locality, between Juchitan and Chivela, Oaxaca.

Erect shrub with brownish branches; leaflets glabrous, aculeate-ciliate.

24. **Mimosa manzanilloana** Rose, Contr. U. S. Nat. Herb. **1**: 326. 1895.

Sinaloa to Guerrero; type from Manzanillo, Colima.

Shrub, 1 to 1.5 meters high, armed with short stout recurved spines; leaflets 1 to 4 cm. long, obtuse or acute; flowers pink; fruit short, hispidulous, about 5 mm. wide.

25. **Mimosa acapulcensis** Robinson, Bot. Gaz. **28**: 135. 1899.

Known only from Acapulco, Guerrero, the type locality.

Spiny shrub; leaflets oblique, 3 to 10 cm. long, acute or obtuse; flower heads racemose; fruit 5 to 6 mm. wide.

26. **Mimosa leptocarpa** Rose, Contr. U. S. Nat. Herb. **1**: 326. 1895.

Colima to Guerrero; type from Manzanillo, Colima.

Straggling shrub, armed with very short recurved spines; leaflets oblong, obtuse, about 1 cm. long; flowers said to be yellowish white; fruit broad, very thin, glabrous, 7 to 11 cm. long, armed on the margin with short curved spines. "Sierilla" (Guerrero).

27. **Mimosa lactiflua** Delile; Benth. Trans. Linn. Soc. **30**: 393. 1875.

Oaxaca; described from cultivated specimens of uncertain source; it is possible that the name does not apply properly to the Oaxaca plant.

Shrub, armed with short straight spines.

28. **Mimosa deamii** Robinson, Proc. Amer. Acad. **35**: 324. 1900.

Known only from the type locality, Salina Cruz, Oaxaca.

Shrub, 3 meters high; flowers pinkish; fruit 3 to 3.4 cm. long, strigose.

29. **Mimosa psilocarpa** Robinson, Proc. Amer. Acad. **35**: 325. 1900.

Known only from the type locality, in the mountains of Oaxaca.

Fruit glabrous, unarmed, 2 to 3 cm. long.

30. **Mimosa sicyocarpa** Robinson, Proc. Amer. Acad. **33**: 313. 1898.

Known only from the type locality, between San Sebastián and Bufa de Mascota, Jalisco.

Shrub, 1 to 2 meters high, sparsely armed with short recurved spines; leaflets narrowly oblong, 1.5 to 2 cm. long; fruit 2.5 to 3 cm. long, densely spiny.

31. **Mimosa caerulea** Rose, Contr. U. S. Nat. Herb. **5**: 141. 1897.

Morelos and Oaxaca; type from Cuernavaca.

Unarmed shrub, about a meter high; leaflets oblong, 1 to 1.5 cm. long, obtuse or acute, nearly glabrous; flowers purplish; fruit glabrous, the margins minutely aculeolate.

32. **Mimosa mixtecana** T. S. Brandeg. Univ. Calif. Publ. Bot. **3**: 379. 1909.

Puebla and Oaxaca; type from the region of San Luis Tultitlanapa, Puebla.

Shrub, armed with straight brown spines; leaflets 6 to 20 mm. long; flowers pink; fruit glabrous, unarmed, long-stipitate.

33. **Mimosa pudica** L. Sp. Pl. 518. 1753.

Veracruz and probably elsewhere. Widely distributed in tropical America; type from Brazil.

Plants decumbent or spreading, suffrutescent occasionally, but perhaps hardly to be considered a shrub; leaflets linear-oblong, about 1 cm. long; flowers white

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or pink. "Dormilona," "pinahuihuixtle," "quecupatli," "sensitiva," "ten vergüenza," "vergonzosa," "xmutz" (Ramírez); "cierra tus puertas" (Guatemala).

34. Mimosa nelsonii Robinson, Proc. Amer. Acad. **33**: 314. 1898.

Mimosa lignosa Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 278. *pl. 23.* 1903.

Michoacán to Oaxaca; type collected between San Gerónimo and La Venta, Oaxaca.

Shrub, 0.3 to 2 meters high, rather sparsely armed with straight spines; leaflets 5 to 10 mm. long, thick, obtuse; flowers pink; fruit short, densely bristly, about 5 mm. wide.

35. Mimosa xanti A. Gray, Proc. Amer. Acad. **5**: 157. 1862.

Mimosa langlassei Micheli. Mém. Soc. Phys. Hist. Nat. Genève **34**: 277. *pl. 23.* 1903.

Baja California (type locality) and Michoacán. Guatemala.

Erect shrub, 1 to 3.5 meters high, often forming dense thickets, armed with stout straight spines; leaflets oblong, about 1 cm. long, acute or obtuse; flowers pink; fruit short, hispid. "Celosa" (Baja California).

36. Mimosa camporum Benth. in Hook. Journ. Bot. **2**: 130. 1840.

Tepic to Guerrero. Central America and South America.

Plants chiefly herbaceous but sometimes somewhat shrubby, nearly or quite without spines; leaflets about 8 mm. long; flowers pink; fruit short, hispid.

37. Mimosa galeottii Benth. Lond. Journ. Bot. **5**: 92. 1846.

Acacia hirta Mart. & Gal. Bull. Acad. Brux. **10**[2]: 318. 1843.

Morelos, Oaxaca, and Guerrero; type from mountains of Yolotepeque, Oaxaca, at an altitude of 2,460 meters.

Shrub or small tree, 3 to 4.5 meters high, armed with rather slender recurved spines; leaflets very numerous, 2 mm. long or shorter; flowers yellowish, turning pink; fruit usually very spiny, about 4 cm. long and 6 mm. wide. "Uña de gato" (Michoacán, Guerrero).

Specimens reported by Micheli[1] as *M. adenotricha* belong here.

38. Mimosa somnians Humb. & Bonpl.; Willd. Sp. Pl. **4**: 1036. 1805.

Veracruz, Oaxaca, and Guerrero. Widely distributed in tropical America.

Plants chiefly herbaceous but often suffrutescent, armed with rather few short spines; leaflets mostly 4 to 5 mm. long; flowers white or pinkish; fruit glabrous or pilose, 3 to 4 mm. wide.

39. Mimosa dormiens Humb. & Bonpl.; Willd. Sp. Pl. **4**: 1035. 1805.

Chiapas. Widely distributed in tropical America.

Ascending or erect shrub, densely armed with slender spines; leaflets about 8 mm. long, pubescent. "Dormidera" (Colombia).

40. Mimosa pigra L. Cent. Pl. **1**: 13. 1755.

Mimosa asperata L. Syst. Nat. ed. 10. 1312. 1759.

Mimosa berlandieri A. Gray; Torr. U. S. & Mex. Bound Bot. 61. 1859.

Tamaulipas to Sinaloa, Chiapas, and Tabasco. Widely distributed in tropical America and Africa.

Erect or ascending shrub, 1 to 2 meters high, armed with numerous stout spines; leaflets linear, about 5 mm. long; flowers pink; fruit hispid, often very densely so, about 1 cm. wide. "Zarza" (Guerrero, Costa Rica); "choven" (Veracruz, San Luis Potosí, *Seler*); "espina de vaca" (Panama).

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[1] Mém. Soc. Phys. Hist. Nat. Genève **34**: 276. 1903.

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41. Mimosa hemiendyta Rose & Robins. Contr. U. S. Nat. Herb. 8: 32. 1903.

Yucatán and Campeche; type from Apazote, Campeche.

Shrub, 1.5 to 6 meters high; leaflets 4 to 5 mm. long, glabrate; fruit with a broad, erose or shallowly lacerate wing.

42. Mimosa lacerata Rose, Contr. U. S. Nat. Herb. 5: 141. 1897.

Querétaro, Morelos, Puebla, and Oaxaca; type from Piaxtla, Puebla.

Shrub, 1.5 to 2.5 meters high, armed with stout spines; leaflets 2 to 3 mm. long; fruit with a broad, deeply lacerate wing.

43. Mimosa leucaenoides Benth. Lond. Journ. Bot. 5: 89. 1846.

San Luis Potosí and Hidalgo; type from Zimapán, Hidalgo.

Shrub or small tree, 3 to 4.5 meters high; leaflets 1.5 to 2.5 cm. long, lustrous; fruit unarmed, about 6 mm. wide.

44. Mimosa micheliana[1] Robinson, Proc. Bost. Soc. Nat. Hist. 31: 259. 1904.

Known only from the type locality, La Correa, Guerrero, altitude 250 meters.

Shrub, armed with small recurved spines; leaflets 9 to 13 mm. long; flowers pale pink.

45. Mimosa ervendbergii[2] A. Gray, Proc. Amer. Acad. 5: 178. 1862.

Veracruz, Oaxaca, and Chiapas; type from Tantoyuca, Veracruz. Central America.

Shrub, probably scandent, armed with very short recurved spines; leaflets 1 to 3 cm. long; flower heads in large naked panicles. "Zarza," "sierrilla" (Oaxaca).

46. Mimosa argillotropha Robinson, Proc. Bost. Soc. Nat. Hist. 31: 257. 1904.

Known only from the type locality, La Correa, Guerrero.

Shrub, armed with very small recurved spines; leaflets 1 cm. long or shorter; flowers white.

47. Mimosa tenuiflora Benth. Lond. Journ. Bot. 5: 92. 1846.

Type from Zimapán, Hidalgo.

Pinnae 1 to 3 pairs; branchlets glabrous.

48. Mimosa invisa Mart. Herb. Fl. Bras. 121. 1837–40.

Schrankia brachycarpa Benth. in Hook. Journ. Bot. 2: 130. 1840.

Sinaloa to Guerrero and Veracruz. Widely distributed in tropical America.

Procumbent or prostrate plant, chiefly herbaceous, armed with very numerous short recurved spines; leaflets 5 mm. long; flowers pink; fruit hispid, 4 mm. wide. "Dormilona" (Costa Rica).

The roots have a disagreeable odor and are said to have irritant properties. In Costa Rica the bitter infusion of the leaves is considered tonic, and the seeds are sometimes used as an emetic.

49. Mimosa grahami A. Gray, Pl. Wright. 2: 52. 1853.

Northern Sonora (type locality) and Chihuahua.

Shrub, armed with rather slender spines; leaflets 4 mm. long; flowers pink; margins of the fruit with a few short spines, about 6 mm. wide.

50. Mimosa eurycarpa Robinson, Proc. Amer. Acad. 33: 322. 1898.

Mimosa eurycarpoides Robinson, Proc. Amer. Acad. 36: 472. 1901.

Sinaloa to Oaxaca; type collected between Guichocovi and Lagunas, Oaxaca.

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[1] Named for Marc Micheli, a botanist of Geneva, who published a paper describing the Leguminosae collected in Mexico by Eugène Langlassé.

[2] L. C. Ervendberg made a small collection of plants in the District of Huasteca, Veracruz, in 1858 and 1859. This was reported upon by Gray in 1861 (Proc. Amer. Acad. 5: 174–190).

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Shrub or small tree, sometimes 6 meters high; leaflets 4 to 6 mm. long; flowers white; fruit broad, thin, sparsely hispid on the valves. "Rabo de iguana" (Guerrero); "uña de gato" (Oaxaca).

It is possible that *M. eurycarpoides* is distinct, but it is known only from flowering branches, which show no essential differences from *M. eurycarpa*. The fruit originally described as belonging to *M. eurycarpoides* is probably that of *Acacia farnesiana*.

51. **Mimosa colimensis** Robinson, Proc. Bost. Soc. Nat. Hist. 31: 358. 1904.

Known only from Colima, the type locality.

Shrub, armed with short recurved spines; leaflets 5 to 7 mm. long; flower heads racemose-paniculate.

It is doubtful whether this is distinct from *M. eurycarpa*. The fruit is not known.

52. **Mimosa malacophylla** A. Gray, Journ. Bost. Soc. Nat. Hist. 6: 182. 1850.

Chihuahua and Coahuila to Tamaulipas. Western Texas; type collected on the Rio Grande.

Scandent or recumbent shrub, 3 to 4.5 meters high, armed with numerous small recurved spines; leaflets mostly oval, 7 to 14 mm. long, obtuse or acute; flowers white, sweet-scented; fruit 5 to 7.5 cm. long, 1 cm. wide, glabrous. "Raspa-huevos" (Nuevo León, Tamaulipas); "raspilla" (Tamaulipas).

53. **Mimosa wootonii**[1] Standl., sp. nov.

Type from Hacienda Buena Vista, Tamaulipas (*Wooton*, June 14, 1919; U. S. Nat. Herb. no. 989828).

Subscandent shrub, the branches angulate, glabrous, armed with very numerous short recurved prickles; leaf rachis 9 to 12 cm. long, with numerous recurved prickles, sparsely puberulent with short curled hairs; pinnae 3 or 4 pairs; leaflets usually 4 or 5 pairs, oval-elliptic, oval, or sometimes obovate-oval, 8 to 15 mm. long, 5 to 9 mm. wide, acute or obtuse at apex, mucronate, bright green, glabrous, with rather prominent venation; flowers capitate, racemose, the peduncles fasciculate, 1.2 to 2 cm. long, puberulent; calyx and corolla glabrous, the calyx one-third as long as the corolla; ovary glabrous. "Raspilla," "raspa-huevos."

Except in pubescence, this plant is almost exactly like *M. malacophylla* Gray, which was collected at the same locality. It may be only a form of that species; but in the latter the pubescence is very copious on all parts, consisting of short straight hairs. The quality and quantity of pubescence seem to be constant characters in the other Mexican species of the genus.

54. **Mimosa zygophylla** Benth.; A. Gray, Pl. Wright. 1: 61. 1852.

Coahuila, Nuevo León, San Luis Potosí, and Zacatecas; type from the region of Saltillo.

Densely branched shrub, 0.3 to 1 meter high or larger, armed with short stout recurved spines; leaflets about 3 mm. long; flowers pink; fruit short, glabrous, unarmed or nearly so, 7 cm. wide.

55. **Mimosa hystricosa** T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 86. 1910.

Jalisco to Puebla; type from Cerro de Gavilán, Puebla.

Shrub, armed with numerous short spines; leaflets 5 to 8 mm. long; fruit very spiny.

56. **Mimosa monancistra** Benth. Pl. Hartw. 12. 1839.

?*Mimosa herincquiana* Micheli, Mém. Soc. Phys. Genève 34: 276. *pl. 21.* 1903.

Coahuila to San Luis Potosí, Oaxaca, and Jalisco; type from Aguascalientes.

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[1] Named for Elmer Ottis Wooton (1865–), now of the U. S. Department of Agriculture, who made a collection of plants in Tamaulipas in 1919.

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Shrub, 0.6 to 1.5 meters high, sparsely or densely armed with short spines; leaflets 3 to 5 mm. long; flowers pink; fruit very spiny, 4 to 5 mm. wide. "Garabatillo" (Aguascalientes); "uña de gato" (Guanajuato).

57. Mimosa emoryana Benth. Trans. Linn. Soc. Bot. **30**: 426. 1875.

Chihuahua and Durango. Western Texas (type locality).

Shrub, densely pubescent, armed with numerous stout spines; leaflets 3 to 5 mm. long; flowers pink; fruit very spiny, about 5 mm. wide.

58. Mimosa lindheimeri[1] A. Gray, Proc. Bost. Soc. Nat. Hist. **6**: 181. 1850.

Mimosa biuncifera lindheimeri Robinson, Proc. Amer. Acad. **33**: 328. 1898.

Coahuila to San Luis Potosí, Puebla, and Michoacán. Western Texas (type locality).

Erect, very spiny shrub, nearly glabrous, with reddish purple or pink flowers; leaflets 2 to 3 mm. long; fruit armed with spines on the margins, 4 to 5 mm. wide.

59. Mimosa purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. **3**: 379. 1909.

Puebla and Oaxaca; type from Cerro de Matzize, Puebla.

Very spiny shrub, densely pubescent; leaflets 3 to 4 mm. long; flowers pink; fruit densely pubescent, 6 mm. wide, with a few short spines on the margins.

60. Mimosa pringlei S. Wats. Proc. Amer. Acad. **21**: 452. 1886.

Chihuahua; type collected near the city of Chihuahua. Western Texas.

Densely branched shrub, armed with short slender recurved spines; leaflets 3 to 4 mm. long; fruit 2 cm. long, glabrous, unarmed or nearly so.

61. Mimosa depauperata Benth. Pl. Hartw. 13. 1839.

Acacia canescens Mart. & Gal. Bull. Brux. **10**[2]: 312. 1843.

Querétaro to Mexico and Oaxaca; type from Actopan, Hidalgo.

Shrub, 0.3 to 1 meter high, very spiny; leaflets 2 to 3 mm. long; fruit densely pubescent, 5 mm. wide, the margins armed with stout straight spines.

62. Mimosa calcicola Robinson, Proc. Amer. Acad. **33**: 325. 1898.

Hidalgo and Puebla; type from plains near Tehuacán, Puebla.

Shrub, 0.3 to 1 meter high, very spiny; leaflets 2 to 4 mm. long; flowers white or pinkish; fruit densely pubescent, unarmed or nearly so, about 4 mm. wide.

63. Mimosa minutifolia Robins. & Greenm. Amer. Journ. Sci. III. **50**: 150. 1895.

Jalisco; type from Río Blanco.

Fruit very spiny, 7 to 8 mm. wide.

64. Mimosa mollis Benth. in Hook. Journ. Bot. **4**: 408. 1842.

Puebla; type from Acatlán.

Shrub, armed with short flat spines, densely pubescent; leaflets 4 to 6 mm. long; fruit densely pubescent, unarmed.

65. Mimosa biuncifera Benth. Pl. Hartw. 12. 1839.

Mimosa prolifica S. Wats. Proc. Amer. Acad. **21**: 452. 1886.

Chihuahua to San Luis Potosí, Mexico, Oaxaca, and Durango; type from León, Guanajuato. Southern Arizona and New Mexico.

Shrub 1 to 2 meters high, densely armed with stout recurved spines; leaflets mostly 2 to 3 mm. long; flowers pink or white; fruit very spiny on the margins. "Gatuño" (Zacatecas, Durango, Chihuahua); "uña de gato" (Chihuahua, Texas, etc.).

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[1] Ferdinand Lindheimer (1801–1879), a native of Germany, resided for more than 30 years in Texas, where he made large collections of plants. These were reported upon by Gray and Engelmann. The genus *Lindheimera*, of the family Asteraceae, was named in his honor.

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66. Mimosa lemmoni A. Gray, Proc. Amer. Acad. 19: 76. 1883.

Northern Chihuahua and Sonora. Southern New Mexico and Arizona; type from Huachuca Mountains, Arizona.

Shrub, about 1 meter high, very pubescent; fruit densely pubescent, unarmed or nearly so, about 6 mm. wide.

67. Mimosa aculeaticarpa Ortega, Hort. Matr. Dec. 134. 1800.

Mimosa acanthocarpa Benth. in Hook. Journ. Bot. 4: 409. 1842.

Mimosa acanthocarpa desmanthocarpa Robinson, Proc. Amer. Acad. 36: 472. 1901.

Mimosa aculeaticarpa imparilis Macbride, Contr. Gray Herb. n. ser. 59: 12. 1919.

San Luis Potosí to Tepic, Chiapas, and Hidalgo.

Shrub or small tree, armed with numerous spines; flowers white or pink; fruit usually spiny on the margins, about 6 mm. wide, reddish brown.

Mimosa acanthocarpa desmanthocarpa is a form with unarmed fruit. *M. acaleaticarpa imparilis* has glandular and hirsute branchlets.

DOUBTFUL SPECIES.

MIMOSA ARCUATA Mart. & Gal. Bull. Acad. Brux. 10[2]: 308. 1843. Type from Tehuacán, Puebla. According to Robinson, probably a synonym of *M. biuncifera* Benth.

MIMOSA GEMINATA DC. Prodr. 2: 427. 1825. Described from Mexico.

MIMOSA TRICEPHALA Cham. & Schlecht. Linnaea 5: 591. 1830. Type from Actopan, Hidalgo.

7. ACUAN Medic. Theod. Sp. 62. 1786.

Low suffrutescent or herbaceous plants, unarmed; leaves bipinnate, the leaflets numerous, small, the stipules setaceous, persistent; flowers in dense heads; fruit linear, compressed.

Several other species of the genus occur in Mexico, but they are herbaceous plants.

Fruit 3 to 5 mm. wide ..... 1. A. virgatum.
Fruit 5 to 6 mm. wide ..... 2. A. fruticosum.

1. Acuan virgatum (L.) Medic. Theod. Sp. 62. 1786.

Mimosa virgata L. Sp. Pl. 519. 1753.

Desmanthus virgatus Willd. Sp. Pl. 4: 1047. 1806.

Sonora to San Luis Potosí, Veracruz, and Oaxaca. Widely distributed in tropical America.

More commonly, perhaps, a herbaceous plant, but often a shrub 1 to 3 meters high; leaflets 2 to 4 mm. long, oblong, obtuse; flowers white; fruit 4.5 to 10 cm. long, glabrous.

2. Acuan fruticosum (Rose) Standl.

Desmanthus fruticosus Rose, Contr. U. S. Nat. Herb. 1: 131. *pl. 13.* 1892.

Baja California; type from Carmen Island.

Slender shrub, 1.5 to 3 meters high; leaflets oblong, 5 to 9 mm. long; fruit 4 to 8 cm. long.

8. LEUCAENA Benth. in Hook. Journ. Bot. 4: 416. 1842.

Unarmed trees or shrubs; leaves bipinnate, the leaflets few and large or numerous and small, the petiole usually glanduliferous; stipules small; flowers in dense globose heads, white; fruit flat, stipitate, bivalvate.

Some of the South American species are said to be employed to poison or stupefy fish.

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Leaflets large, most of them 0.8 to 3 cm. wide, comparatively few.
  Mature fruit 2.5 to 4.5 cm. wide.
    Leaflets 6 to 8 pairs; pinnae 3 to 6 pairs ..... 1. L. plurijuga.
    Leaflets 2 to 4 pairs; pinnae 2 or 3 pairs.
      Leaflets lance-ovate, 1.5 to 2.3 cm. wide; fruit 2.5 to 3 cm. wide. 2. L. macrophylla.
      Leaflets broadly ovate or oval, most of them 2.5 to 3.5 cm. wide; fruit 3.5 to 4.5 cm. wide ..... 3. L. macrocarpa.
  Mature fruit less than 2 cm. wide.
    Leaflets lance-oblong or oblong-ovate, 0.8 to 1.3 cm. wide ..... 4. L. lanceolata.
    Leaflets oval or rounded-oval, most of them 1.5 to 3.5 cm. wide or larger. 5. L. microcarpa.
Leaflets small, 1 to 8 mm. wide, numerous.
  Young branches sharply angulate ..... 6. L. esculenta.
  Young branches terete.
    Corolla glabrous.
      Leaflets 6 mm. long or shorter.
        Leaflets thin, linear-oblong, the venation plane, rounded or obtuse at apex ..... 7. L. diversifolia.
        Leaflets coriaceous, oval-oblong or broadly oblong, the venation prominent beneath, cuspidate at apex ..... 8. L. cuspidata.
      Leaflets 10 mm. long or longer.
        Leaflets oblong, obtuse or rounded at apex, 3 to 8 mm. wide; fruit puberulent ..... 9. L. shannoni.
        Leaflets narrowly lance-oblong, acute, 2.5 to 4 mm. wide; fruit glabrous. 10. L. glabrata.
    Corolla pubescent.
      Limb of the corolla pilose with spreading yellow hairs; beak of the fruit 1.5 to 3.5 cm. long ..... 11. L. greggii.
      Limb of the corolla pilose with minute appressed hairs; beak of the fruit less than 1 cm. long.
        Corolla 3 to 4 times as long as the calyx ..... 12. L. pulverulenta.
        Corolla about twice as long as the calyx.
          Leaflets 7 to 15 mm. long ..... 13. L. glauca.
          Leaflets 2 to 5 mm. long.
            Leaflets glabrous on the faces, the costa impressed beneath. 14. L. brachycarpa.
            Leaflets densely pilose on both surfaces with minute, mostly spreading hairs, the costa prominent beneath ..... 15. L. stenocarpa.

1. **Leucaena plurijuga** Standl. Contr. U. S. Nat. Herb. 20: 189. 1919.

Querétaro, Guanajuato, and Michoacán; type from Monte León, Michoacán.

Leaflets oblong or oval, 2 to 3 cm. long, rounded at apex, nearly glabrous; fruit about 24 cm. long.

2. **Leucaena macrophylla** Benth. Bot. Voy. Sulph. 90. 1844.

Colima to Guerrero; type from Acapulco, Guerrero. Reported from Panama.

Small tree, about 3.5 meters high; leaflets 5 to 6.5 cm. long, acute, pubescent beneath when young, glabrate in age; fruit about 20 cm. long.

3. **Leucaena macrocarpa** Rose, Contr. U. S. Nat. Herb. 1: 327. *f. 6.* 1895.

Tepic to Colima; type from Río Blanco, Jalisco.

Shrub or small tree, sometimes 7.5 meters high; leaflets 4 to 9 cm. long, acute or obtuse, bright green, nearly glabrous; flower heads 1 cm. in diameter, racemose.

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4. **Leucaena lanceolata** S. Wats. Proc. Amer. Acad. 21: 427. 1886.

Sonora, Chihuahua, and Sinaloa; type from Hacienda San Miguel, Chihuahua.

Shrub, 1.5 to 3 meters high; leaflets 2 to 4 cm. long, acute; flower heads 1.5 to 2 cm. in diameter; fruit 12 to 18 cm. long.

5. **Leucaena microcarpa** Rose, Contr. U. S. Nat. Herb. 5: 141. 1897.

Baja California and Sinaloa to Morelos and Guerrero; type from Miraflores, Baja California.

Shrub or tree, sometimes 6 meters high; leaflets 2 to 5.5 cm. long, rounded to acute at apex, thick, lustrous; flowers white, the heads 2 cm. in diameter. "Guajillo" (Michoacán, Guerrero).

It is possible that the southern plant, with larger leaflets, represents another species. All the material is very close to *L. trichodes* (Jacq.) Benth., of Hispaniola.

6. **Leucaena esculenta** (Moc. & Sessé) Benth. Trans. Linn. Soc. 30: 442. 1875.

Acacia esculenta Moc. & Sessé; DC. Prodr. 2: 470. 1825.

Mimosa esculenta Moc. & Sessé, Pl. Nov. Hisp. 178. 1887.

Jalisco to Puebla and Chiapas; type from "Nova-Hispania."

Tree, 6 to 15 meters high; leaves often 40 cm. long, the leaflets linear, 3 to 4 mm. long, glabrate; flowers white, odorless, the heads 2 cm. in diameter, arranged in large racemes or panicles; fruit 12 to 27 cm. long, 2 to 3 cm. wide, red or purplish. "Guaje" or "huaje" (Jalisco, Mexico, Morelos, Oaxaca; derived from the Nahuatl *huaxin*, *hoatzin*, or *hoaxin*); "uachi blanco" (Chiapas); "huassi," "guaxi" (Otomí, *Peñafiel*).

Sessé and Mociño state that the pods were an article of commerce and that the seeds, in spite of their unpleasant flavor, were eaten by the Indians, who believed that they possessed aprodisiac properties. The seeds are still eaten in Mexico, usually with salt.

This is probably the plant of which Sahagún writes: "There is a tree known as *uaxin*. It is of medium size; its trunk is smooth, likewise the leaves, which are almost like those of the árbol del Perú [*Schinus molle*]. It bears a fruit like that of the carob, which is good to eat and is offered for sale in the markets."

According to Robelo, the geographic name Oaxaca takes its derivation from the word *huaxin*, the Nahuatl form being Huaxyacac, or "place where the *huaxin* begins to grow." The word Huaxtl signifies "where the *huaxin* abounds," and Huajuapan "river of the *huaxin*."

7. **Leucaena diversifolia** (Schlecht.) Benth. in Hook. Journ. Bot. 4: 417. 1842.

Acacia diversifolia Schlecht. Linnaea 12: 570. 1838.

Jalisco to Oaxaca and Veracruz; type from Jalapa, Veracruz.

Shrub; leaves large, glabrate; flower heads 2 cm. in diameter; fruit 15 to 20 cm. long, about 1.5 cm. wide, lustrous.

8. **Leucaena cuspidata** Standl. Contr. U. S. Nat. Herb. 20: 189. 1919.

Known only from the type locality, Minas de San Rafael, San Luis Potosí.

Leaflets pale beneath; flower heads less than 1 cm. in diameter.

9. **Leucaena shannoni** Donn. Smith, Bot. Gaz. 57: 419. 1914.

Chiapas. El Salvador (type locality).

Shrub or tree; leaflets oblong, 2.5 to 4 mm. wide, obtuse; flowers glabrous; fruit puberulent.

10. **Leucaena glabrata** Rose, Contr. U. S. Nat. Herb. 5: 140. 1897.

Guerrero and Puebla to Chiapas: type from Acapulco, Guerrero.

Tree, 9 to 12 meters high, with a trunk 30 cm. or more in diameter; leaflets glabrous or nearly so. "Guaje" (Guerrero).

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The Chiapas plant (known as "uaxi" or "guacis") has very short fruit, and is perhaps distinct. The seeds are eaten raw when they are green.

11. Leucaena greggii S. Wats. Proc. Amer. Acad. **23**: 272. 1888.

Coahuila and Nuevo León; type from Rinconada. Southwestern Texas.

Shrub or small tree, 3 to 4.5 meters high; leaflets 5 to 7 mm. long, acute, glaucous; flower heads 1.5 cm. in diameter; fruit 14 to 19 cm. long, 1 cm. wide; wood hard, close-grained, brown, its specific gravity about 0.92.

12. Leucaena pulverulenta (Schlecht.) Benth. in Hook. Journ. Bot. **4**: 417. 1842.

Acacia pulverulenta Schlecht. Linnaea **12**: 571. 1838.

Nuevo León, Tamaulipas, and Veracruz; type from San Antonio, Veracruz. Southwestern Texas.

Tree, sometimes 18 meters high, the tall straight trunk sometimes 50 cm. in diameter, covered with cinnamon-brown bark; leaflets 3 to 4 mm. long, glabrate; flowers white, sweet-scented; fruit 11 to 18 cm. long, about 1.5 cm. wide; wood hard, heavy, close-grained, of a rich, dark brown color, the sapwood bright clear yellow, the specific gravity about 0.67. "Tepeguaje," "quiebra-hacha" (Tamaulipas).

The tree is a source of lumber, which is employed for general purposes.

13. Leucaena glauca (L.) Benth. in Hook. Journ. Bot. **4**: 416. 1842.

Mimosa glauca L. Sp. Pl. 520. 1753.

Jalisco to Michoacán, Chiapas, and Yucatán. Widely distributed in tropical and subtropical America.

Shrub or tree, sometimes 10 meters high, with a trunk 10 cm. in diameter, the bark dark brown, somewhat scaly; leaves 10 to 30 cm. long; flowers whitish; fruit 10 to 15 cm. long, 1.5 cm. wide; wood hard, close-grained, light brown. "Xaxim" (Yucatán, Maya); "uaxi," "guacis" (Chiapas); "aroma blanca" (Cuba); "hediondilla" (Porto Rico); "granalino" (Santo Domingo).

There is a prevalent belief in tropical America that if horses, mules, or pigs eat any part of the plant their hair will fall out. Cattle are said not to be affected, and in Mauritius the plant is considered valuable as forage for goats. The seeds are sometimes used for making necklaces, bracelets, and other articles. Grosourdy reports that the roots have emmenagogue and abortive properties. The plant has been introduced into the tropics of the old World, where it is sometimes planted for hedges. It grows readily from cuttings. Its most common English name is "lead-tree," but in the Bahamas it is known as "jumby-bean."

14. Leucaena brachycarpa Urban, Symb. Antill. **2**: 265. 1900.

Veracruz. Described from plants cultivated in Jamaica.

Tree, 7.5 meters high; flower heads 1 cm. in diameter; fruit 10 to 11 cm. long, 1.2 cm. wide.

15. Leucaena stenocarpa Urban, Symb. Antill. **2**: 266. 1900.

Oaxaca; type from foothills of the Sierra de San Felipe.

Small tree, 4.5 meters high; fruit about 10 cm. long and 1.2 cm. wide.

DOUBTFUL SPECIES.

LEUCAENA LAXIFOLIA Urban, Symb. Antill. **2**: 296, 1900. Described from Mexico. Closely related to *L. diversifolia* (Schlecht.) Benth.

LEUCAENA TRICHANDRA (Zucc.) Urban, Symb. Antill. **2**: 267. 1900. *Acacia trichandra* Zucc. Abh. Akad. Wiss. München **2**: 349. 1838. Described from cultivated specimens, probably of Mexican origin. Very closely related to *L. diversifolia*, and doubtfully distinct. Bentham considered it synonymous with that species.

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9. ACACIA Willd. Sp. Pl. 4: 1049. 1806.

REFERENCE: Benth. Trans. Linn. Soc. Bot. 30: 444–533. 1875.

Trees or shrubs, rarely herbs, usually armed with spines; leaves bipinnate, the leaflets usually small and numerous, the petiole usually glanduliferous; flowers small but often showy, capitate or spicate, the stamens numerous (sometimes as many as 400), exserted; fruit very variable in form.

The species of *Acacia* are widely distributed in the tropics of both hemispheres, being particularly abundant in Australia. Many of them yield useful gums, gum arabic being furnished by *A. scorpioides* (L.) W. F. Wight [*A. arabica* (Lam.) Willd.] and other species. This gum is employed in medicine as a remulcent and has varied uses in different industries.

A. Spines very large, most of them 5 mm. wide at the base or often much broader, either inflated and then usually punctured by ants or flattened and sword-shaped, never abruptly recurved, sometimes boat-shaped.
- Involucel borne at or above the middle of the peduncle; bractlets of the flower heads not peltate; spines often puberulent when young.
  - Flowers in globose heads.
    - Spines boat-shaped ..... 1. A. cochliacantha.
    - Spines sword-shaped, flat ..... 2. A. macracantha.
  - Flowers in cylindrical spikes.
    - Spines turgid and only slightly compressed ..... 3. A. standleyi.
    - Spines flat, strongly compressed ..... 4. A. gladiata.
- Involucel borne near the base of the peduncle, or at least below the middle; bractlets peltate; spines glabrous.
  - Fruit indehiscent, terete, terminating in a spinose beak.
    - Flowers in globose or oblong-globose heads ..... 5. A. sphaerocephala.
    - Flowers in long cylindric spikes ..... 6. A. cornigera.
  - Fruit dehiscent.
    - Fruit opening by a single suture. Flowers spicate ..... 7. A. hindsii.
    - Fruit opening by 2 sutures.
      - Flowers in globose heads ..... 8. A. globulifera.
      - Flowers in cylindric spikes.
        - Spines much broadened and compressed at base; fruit somewhat compressed ..... 9. A. nelsonii.
        - Spines little broadened and scarcely at all compressed; fruit terete or nearly so ..... 10. A. collinsii.

AA. Spines often wanting, when present much smaller, usually much less than 5 mm. wide at base, never boat-shaped or large and sword-shaped, often abruptly recurved.
- B. Flowers spicate.
  - Leaflets large, all or most of them more than 1 cm. wide.
    - Flowers pedicellate. Plant glabrous ..... 11. A. reniformis.
    - Flowers sessile.
      - Stipular spines mostly 1 to 3 cm. long ..... 13. A. conzattii.
      - Stipular spines 5 mm. long or shorter.
        - Leaves densely short-pilose at maturity ..... 15. A. californica.
        - Leaves glabrous or nearly so at maturity or puberulent.
          - Fruit 5 mm. wide or narrower ..... 14. A. pringlei.
          - Fruit 1 to 2.5 cm. wide.
            - Pinnae one pair; leaflets subchartaceous, longer than broad. ..... 16. A. unijuga.
            - Pinnae 2 or 3 pairs; leaflets coriaceous, nearly as broad as long. ..... 12. A. sororia.

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Leaflets small, the largest 6 mm. wide.
Petioles flat, striate, usually 10 to 20 cm. long; leaflets soon deciduous. 17. A. willardiana.
Petioles not flat and striate, commonly less than 10 cm. long; leaflets persistent.
Stipules spinelike, usually 1 to 3 cm. long.
Leaflets glabrous 18. A. amentacea.
Leaflets pubescent.
Fruit densely hirtellous 19. A. bilimekii.
Fruit glabrous or minutely puberulent 20. A. sonorensis.
Stipules not spinelike, the spines all less than 1 cm. long.
Leaflets 3 to 7 pairs.
Leaflets 2.5 to 4 mm. long; fruit about 1.5 cm. wide. 21. A. greggii.
Leaflets mostly 6 to 10 mm. long; fruit 2 cm. wide or wider. 22. A. wrightii.
Leaflets 10 to many pairs in all or most of the leaves.
Rachis of the leaves with recurved spines 23. A. iguana.
Rachis of the leaves unarmed.
Pinnae much shorter than the rachis of the leaf, usually numerous (commonly 15 or more).
Fruit velvety-puberulent, about 2 cm. wide 24. A. macilenta.
Fruit glabrous or nearly so, about 1.5 cm. wide.
Rachis of the leaves glabrous 25. A. millefolia.
Rachis of the leaves densely short-pilose 32. A. acatlensis.
Pinnae nearly or quite as long as the rachis or often longer, usually less than 10.
Leaflets 7 to 10 pairs 26. A. rotundata.
Leaflets 10 to many pairs.
Pinnae 2 to 5 pairs.
Leaflets 8 to 11 mm. long 27. A. gaumeri.
Leaflets 2 to 6 mm. long.
Surfaces of the leaflets glabrous, the margins ciliate. 28. A. dolichostachya.
Surfaces, at least the lower one, of the leaflets puberulent or sericeous.
Leaflets about 2 mm. long; fruit 16 mm. wide. 29. A. compacta.
Leaflets 6 mm. long; fruit 8 mm. wide. 30. A. mammifera.
Pinnae 6 to 10 pairs in all or most of the leaves.
Pinnae mostly 5 to 8 cm. long; fruit glabrous. 31. A. coulteri.
Pinnae mostly 1.5 to 3 cm. long; fruit pubescent. 32. A. acatlensis.

BB. Flowers capitate.
Stipules spinose, stout, straight, usually long.
Fruit covered with thick stalked glands 33. A. glandulifera.
Fruit without glands, or the glands sessile.
Fruit flat, bivalvate; bracts borne near the middle of the peduncle.
Fruit 2 to 3 cm. long, strongly curved; spines very slender, yellowish. 34. A. biaciculata.
Fruit 5 to 12 cm. long, straight or nearly so; spines stout, brown, white, or grayish.

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Pinnae 4 to 9 (rarely 3) pairs; leaflets usually puberulent, slightly or not at all viscid.....35. A. constricta.
Pinnae 1 or 2 (rarely 3) pairs; leaflets glabrous, very viscid. 36. A. vernicosa.
Fruit turgid, tardily or not at all dehiscent; bracts borne at the summit of the peduncle.
Pinnae 2 to 8 pairs.
Fruit glabrous, 5 to 7.5 cm. long.....37. A. farnesiana.
Fruit pubescent, 7.5 to 10 cm. long.....38. A. tortuosa.
Pinnae 10 to 60 pairs.
Fruit 2 to 2.5 cm. wide.....39. A. pennatula.
Fruit 0.7 to 1 cm. wide.....1. A. cochliacantha.
Stipules not spinose, the spines infrastipular.
C. Leaflets large, more than 5 mm. wide, usually 1 to 2.5 cm.
Leaflets one pair, thick-coriaceous.....40. A. crassifolia.
Leaflets 2 to many pairs, usually thin.
Leaflets 2 or 3 pairs.....41. A. rosei.
Leaflets 4 to many pairs.
Stems densely setose-pilose.....42. A. crinita.
Stems glabrous.
Costa of the leaflets strongly excentric; fruit 3 cm. wide; plants armed with short spines.....43. A. anisophylla.
Costa of the leaflets nearly central; fruit about 1.2 cm. wide; plants unarmed.
Leaflets oblong or oval-oblong, chartaceous, the venation not prominent on the upper surface.....52. A. penicillata.
Leaflets broadly oval or suborbicular, nearly as broad as long, coriaceous, the venation prominent on the upper surface. 53. A. tequilana.
CC. Leaflets small, less than 5 mm. wide.
D. Petioles without glands; flowers pedicellate; plants unarmed.
E. Stems hirsute or pilose with long or with short and dense, spreading hairs.
Margins of the leaflets revolute; leaflets usually pubescent on both surfaces with short curved hairs.....44. A. polypodioides.
Margins of the leaflets plane; leaflets glabrous on the faces or pilose with short straight hairs.
Pinnae 2 to 5 pairs; leaflets 10 to 13 pairs. Stems hirsute. 45. A. leucothrix.
Pinnae usually 5 to 10 pairs or more; leaflets numerous.
Venation of the lower surface of the leaflets not elevated. Leaflets glabrous beneath.....46. A. villosa.
Venation of the lower surface of the leaflets elevated.
Leaflets glabrous beneath, ciliate; fruit hirsute; stems sparsely hirsute.....47. A. filicioides.
Leaflets pilose beneath; fruit glabrous or nearly so; stems densely short-pilose..... 48. A. elegans.
EE. Stems glabrous or puberulent, the pubescence of short, appressed or incurved hairs.
Leaflets 1.5 mm. wide or narrower, oblong-linear or narrowly oblong, the venation not reticulate, although sometimes prominulous.
Venation of the lower surface of the leaflets elevated. 48. A. elegans.

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Venation of the lower surface of the leaflets not elevated.
Pinnae usually 3 to 6 pairs; leaflets commonly 10 to 15 pairs; leaves rarely over 5 cm. long----------**49. A. cuspidata.**
Pinnae usually 6 to 10 or more pairs; leaflets numerous; leaves usually 8 to 10 cm. long or larger----**50. A. angustissima.**
Leaflets 2 to 7 mm. wide, oval or broadly oblong, the venation reticulate, prominent.
Pinnae 8 to 11 pairs----------**51. A. laevis.**
Pinnae 3 to 5 pairs.
Leaflets oval-oblong, about twice as long as broad.
52. A. penicillata.
Leaflets quadrangular-orbicular, nearly as broad as long.
53. A. tequilana.
DD. Petioles with glands; flowers sessile or nearly so; plants usually armed with spines.
Pinnae 6 to many pairs in all or most of the leaves.
Leaflets linear or oblong-linear, 1 mm. wide or narrower.
Fruit long-stipitate, glabrous or nearly so, very thin.
54. A. paniculata.
Fruit sessile, densely velvety-puberulent, thick.
55. A. berlandieri.
Leaflets oblong, or narrowly oblong, more than 1 mm. wide.
Costa of the leaflets close to the upper margin.
56. A. glomerosa.
Costa remote from the margin.
Leaflets thick, densely puberulent beneath; fruit subsessile, densely puberulent, the valves thick--**57. A. subangulata.**
Leaflets thin, glabrous or nearly so; fruit stipitate, glabrate, the valves thin----------**58. A. riparia.**
Pinnae 1 to 4 pairs.
Rachis of the leaves or pinnae armed with spines.
Leaflets glabrous, 4 or 5 pairs----------**59. A. palmeri.**
Leaflets pubescent, 6 to 14 pairs.
Leaflets 6 to 10 pairs; valves of the fruit thin.
60. A. malacophylla.
Leaflets 10 to 14 pairs; valves of the fruit thick.
61. A. purpusii.
Rachis of the leaves and pinnae unarmed.
Leaflets 1.5 mm. wide or narrower---------**62. A. occidentalis.**
Leaflets 2.5 to 5 mm. wide.
Leaflets oval-oblong, bright green---------**63. A. micrantha.**
Leaflets cuneate-oblong, glaucescent-------**64. A. roemeriana.**

1. **Acacia cochliacantha** Humb. & Bonpl.; Willd. Sp. Pl. 4: 1081. 1806. = cymbisp
Mimosa campeachiana Mill. Gard. Dict. ed. 8. *Mimosa* no. 20. 1768.

Chihuahua to Baja California, Puebla, and Chiapas. South America; type from Guayaquil, Ecuador.

Shrub or small tree, 1.5 to 4.5 meters high; spines, especially those on sterile branches, very large, 1.5 to 5 cm. long, boat-shaped, brown or gray, those on fertile branches mostly subulate; leaflets very numerous, 2 to 3 mm. long, linear; flowers yellow; fruit compressed or nearly terete, usually 9 to 10 cm. long, blackish brown, tardily dehiscent or indehiscent. "Quisache corteño," "quisache tepamo" (Michoacán, Guerrero); "cucharitas," "palo de cucharitas" (Oaxaca).

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The spines are very different from those of any other species. Palmer reports that a decoction of the plant is used in Sonora as a remedy for affections of the bladder.

2. **Acacia macracantha** Humb. & Bonpl.; Willd. Sp. Pl. 4: 1080. 1806.
Mimosa lutea Mill. Gard. Dict. ed. 8. *Mimosa* no. 17. 1768.
Acacia lutea Hitchc. Rep. Mo. Bot. Gard. 4: 83. 1893. Not *A. lutea* Leavenw. 1824.

Sinaloa to Puebla and Veracruz. Central America, West Indies, and South America.

Shrub or small tree; spines 2.5 to 5 cm. long, compressed, brown or gray; leaflets numerous, linear, about 2 mm. long; flowers yellow, the heads about 8 mm. in diameter; fruit 10 to 12 cm. long, somewhat compressed, dark brown, tardily if at all dehiscent.

3. **Acacia standleyi** Safford, Journ. Washington Acad. Sci. 4: 367. 1914.
Known only from the type locality, Acaponeta, Tepic.

Shrub; spines 2.5 to 3.5 cm. long, castaneous or grayish, slightly compressed; leaflets about 3 mm. long; flowers yellow, the very dense spikes 2 cm. long.

4. **Acacia gladiata** Safford, Journ. Washington Acad. Sci. 5: 359. *f.* 2. 1915.
Sinaloa and Tepic; type from Rosario, Sinaloa.

Spines 3.5 to 5 cm. long, almost flat, brown or gray; leaflets 3 to 4 mm. long.

Probably only a form of *A. standleyi*.

5. **Acacia sphaerocephala** Schlecht. & Cham. Linnaea 5: 594. 1830.
Acacia veracruzensis Schenck, Repert. Sp. Nov. Fedde 12: 362. 1913.
Acacia dolichocephala Safford, Journ. Washington Acad. Sci. 5: 355. 1915.
Tamaulipas, San Luis Potosí, Veracruz, and Yucatán.

Shrub or small tree, sometimes 6 meters high; spines mostly 4 to 11 cm. long, terete or nearly so, whitish, pale brown, or yellowish; leaflets oblong-linear, 5 to 8 mm. long; flowers yellow; fruit about 5 cm. long, red or reddish brown, with a very long sharp beak. "Cornezuelo" (Tamaulipas); "zubin," "zubinché" (Yucatán, Maya).

The seeds are imbedded in abundant pulp. In this, as in the following species (nos. 6 to 10), the bull-horn acacias, the large spines are usually inhabited by ferocious ants, which enter the spines by a puncture near the apex. These ants subsist upon nectar of the large pale glands which are borne as appendages upon the tips of the leaflets.

6. **Acacia cornigera** (L.) Willd. Sp. Pl. 4: 1080. 1806.
Mimosa cornigera L. Sp. Pl. 520. 1753.
Acacia spadicigera Schlecht. & Cham. Linnaea 5: 595. 1830.
Acacia hernandezii Safford, Journ. Washington Acad. Sci. 4: 358. 1914.
Acacia furcella Safford, Journ. Washington Acad. Sci. 4: 359. 1914.

San Luis Potosí and Veracruz to Chiapas, and probably elsewhere; described from a cultivated plant of Mexican origin. Central America.

Shrub or small tree; spines 2.5 to 10 cm. long, terete or slightly compressed, varying in color from brownish yellow to almost black, often recurved or twisted; leaflets about 8 mm. long, glabrous, the nectar glands 1 to 2 mm. long; flowers yellow, the very dense thick spikes 2.5 to 4 cm. long; fruit 2.5 to 6 cm. long, red or brown at maturity. "Espino blanco" (Chiapas); "zubin," "zubinché" (Yucatán, Maya, *Seler*); "cornezuelo" (Tabasco, *Rovirosa*, Nicaragua); "cuernos del toro" (Oaxaca); "árbol del cuerno" (Veracruz); "cuernitos" (Veracruz, Oaxaca); "huitzmamaxalli" of Hernández; "iscanal blanco" (El

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Salvador). The name "tépame" is reported from Jalisco and Guerrero, but may refer to some other species.

The young shoots are said to be cooked and eaten, and the leaves to be used for the bites of insects, etc.

7. **Acacia hindsii**[1] Benth. Lond. Journ. Bot. 1: 504. 1842.

Acacia sinaloensis Safford, Journ. Washington Acad. Sci. 4: 365. 1914.

Acacia tepicana Safford, Journ. Washington Acad. Sci. 4: 366. 1914.

Sinaloa to Chiapas; type from ~~Manzanillo, Colima~~.

Shrub or small tree; spines mostly 3 to 5 cm. long, brown, gray, or black, usually much compressed and often 2 cm. wide at base; leaflets 3 to 8 mm. long; flowers yellow, the spikes slender, 3 to 5 cm. long; fruit usually 4 to 6 cm. long, brown or blackish, beaked, more or less compressed. "Guisache cortefio," "cornezuelo" (Michoacán, Guerrero); "carretadera" (Sinaloa).

The spines vary greatly in form and color in this and related species, so that it is doubtful whether they afford characters of any value for the separation of species. The bark is employed in Sinaloa as a remedy for scorpion stings.

8. **Acacia globulifera** Safford, Journ. Washington Acad. Sci. 4: 360. 1914.

Type from Tsilam, Yucatán.

Spines 3 to 4 cm. long, terete or slightly compressed, pale; leaflets 3 to 4 mm. long; flowers yellow, in small heads.

A. chiapensis Safford[2] is probably the same species, but since it was described from fruiting specimens and *A. globulifera* from specimens with flowers, it is impossible to be certain. *A. chiapensis* was based on specimens collected near San Fernandino, Chiapas. It is a shrub or small tree, 3 to 5 meters high.

9. **Acacia nelsonii** Safford, Journ. Washington Acad. Sci. 4: 363. 1914.

Vicinity of the type locality, Acapulco, Guerrero.

Spines 2.5 to 3.5 cm. long, grayish or brownish, polished; leaflets about 1 cm. long.

10. **Acacia collinsii** Safford, Science n. ser. 31: 677. 1910.

Acacia yucatanensis Schenck. Repert. Sp. Nov. Fedde 12: 361. 1913.

Chiapas and Yucatán; type collected between Chicoasen and San Fernandino, Chiapas.

Shrub, 3 to 4.5 meters high; spines 3 to 5 cm. long, brown or brownish, polished; leaflets about 1 cm. long; spikes very thick and dense, the flowers yellow; fruit short, slightly or not at all compressed.

11. **Acacia reniformis** Benth. in Hook. Icon. Pl. 12: 59. *pl. 1165.* 1875.

Known only from the type locality, banks of the Río Moctezuma, near Las Apuntas.

Glabrous shrub; pinnae 1 or 2 pairs, the leaflets one pair, orbicular-reniform, 2.5 to 3.5 cm. wide, coriaceous; stipules large, persistent; spikes 2.5 to 3.5 cm. long, lax.

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[1] Richard Brinsley Hinds was an officer of H. M. S. *Sulphur*, a British ship which was engaged from 1836 to 1842 in surveying the western coast of America, the field of operations extending from Peru to Alaska. The botanical collections were obtained by Hinds, Dr. Sinclair, an officer of the ship, and George Barclay, a gardener from Kew. Plants were collected in Mexico about San Blas and Tepic, and at Cape San Lucas and Magdalena Bay, Baja California. They were reported upon by Hinds, the new species being described by Bentham.

[2] Journ. Washington Acad. Sci. 5: 356. 1915.

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12. Acacia sororia Standl. Contr. U. S. Nat. Herb. **20**: 186. 1919.

Querétaro; type from Higuerillas.

Leaflets one pair, oval or orbicular, 1 to 2.5 cm. long, coriaceous, puberulent; fruit strongly compressed, bivalvate, 1.5 to 2.5 cm. wide, puberulent.

13. Acacia conzattii Standl. Contr. U. S. Nat. Herb. **20**: 186. 1919.

Known only from the type locality, Estación Almaloyas, Oaxaca, altitude 800 meters.

Pinnae one pair, the leaflets 2 pairs, 1.5 to 2.5 cm. long; spikes long and slender.

14. Acacia pringlei Rose, Contr. U. S. Nat. Herb. **3**: 316. 1895.

Oaxaca and Guerrero; type from Tomellín Canyon, Oaxaca.

Tree, 6 to 9 meters high; leaflets 1.5 to 5 cm. long, bright green, glabrate; spikes sometimes 12 cm. long; fruit about 15 cm. long, glabrous.

15. Acacia californica T. S. Brandeg. Proc. Calif. Acad. II. **3**: 221. 1892.

Southern Baja California; type from La Palma.

Tree, 5 to 8 meters high, with very short stout spines; pinnae one pair, the leaflets 2 pairs, oval or rounded, 1 to 3 cm. long, thick; flowers cream-colored, the spikes 5 to 10 cm. long. "Guamuchilillo."

16. Acacia unijuga Rose, Contr. U. S. Nat. Herb. **8**: 32. *f.* 8. 1903.

Known only from the type locality, Las Palmas, San Luis Potosí.

Large tree, armed with very short spines; leaflets 2 to 3 cm. long; spikes very slender and interrupted; fruit flat, 1.7 to 2.5 cm. wide, puberulent.

17. Acacia willardiana Rose, Contr. U. S. Nat. Herb. **1**: 88. 1890.

Prosopis heterophylla Benth. Lond. Journ. Bot. **5**: 82. 1846. Not *Acacia heterophylla* Willd. 1805.

Sonora (type locality) and Baja California.

Slender unarmed tree, 3 to 5 meters high, the bark exfoliating in thin yellowish papery sheets; leaflets pale green, 2 to 6 mm. long, soon deciduous from the persistent petiole; flowers pale yellow, the spikes 3 to 6 cm. long; fruit flat, 0.8 to 1.5 cm. wide, glabrous. "Palo liso," "palo blanco" (Sonora).

18. Acacia amentacea DC. Prodr. **2**: 455. 1825.

Acacia rigidula Benth. Lond. Journ. Bot. **1**: 504. 1842.

Nuevo León, Tamaulipas, and San Luis Potosí. Southwestern Texas.

Shrub or small tree, 3 to 4.5 meters high; spines straight, sometimes 5 cm. long; pinnae 1 pair, the leaflets few, oblong, about 1 cm. long, lustrous; spikes short, the flowers yellow, sweet-scented; fruit 3 to 4 mm. wide, compressed, brown, puberulent. "Gavia" (Tamaulipas); "chaparro prieto" (Nuevo León, Tamaulipas).

19. Acacia bilimekii Macbride, Contr. Gray. Herb. n. ser. **59**: 6. 1919.

Acacia sericocarpa Rose, Contr. U. S. Nat. Herb. **8**: 300. 1905. Not *A. sericocarpa* Fitzg. 1904.

Acacia ambigua Rose, Contr. U. S. Nat. Herb. **8**: 31. *f.* 7. 1903. Not *A. ambigua* Hoffmg. 1826.

Morelos and Puebla; type from Matamoros, Puebla.

Low shrub, densely pubescent; spines 1 to 2 cm. long, whitish; leaflets oblong, about 1 cm. long; fruit 5 mm. wide.

20. Acacia sonorensis Rose, Contr. U. S. Nat. Herb. **8**: 31. 1903.

Known only from the type locality, Guaymas, Sonora.

Shrub; pinnae one pair, the leaflets 2 or 3 pairs, oblong, 6 to 12 mm. long.

21. Acacia greggii A. Gray, Pl. Wright. **1**: 65. 1852.

Chihuahua and Coahuila; type from valley west of Patos. Western Texas to southern Arizona.

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Shrub or tree, sometimes 9 meters high, with a trunk 30 cm. in diameter; pinnae 1 to 3 pairs; flowers yellowish, fragrant, the spikes 3 to 5 cm. long; fruit flat, 8 to 12 cm. long; wood hard, strong, durable, reddish brown, its specific gravity about 0.85. "Uña de gato" (Chihuahua, New Mexico, Texas, Arizona); "gatuño" (Chihuahua).

A gum similar to gum arabic, which exudes from the trunk, is used locally. The seeds were used for food by some of the Indians of Arizona and Mexico.

22. Acacia wrightii Benth.; A. Gray, Pl. Wright. 1: 64. 1852.

Tamaulipas to Sonora and Baja California. Western Texas (type locality) to southern California.

Shrub or tree, sometimes 9 meters high, with a trunk 30 cm. in diameter, the bark thin, broken into grayish brown scales; pinnae 2 or 3 pairs, the leaflets oblong or obovate; flowers light yellow, the spikes 3 to 5 cm. long; fruit flat, 8 to 11 cm. long, thin; wood hard, close-grained, light brown, its specific gravity about 0.94. "Uña de gato" (Nuevo León); "uña de gato negra" (Tamaulipas).

The wood is of little use except for fuel.

23. Acacia iguana Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 281. *pl. 25.* 1903.

Michoacán and Guerrero; type from La Puerta.

Tree, 12 to 15 meters high, armed with short, recurved spines; leaflets oblong, 8 to 15 mm. long; flowers yellowish white, the spikes short or elongate. "Rabo de iguana."

24. Acacia macilenta Rose, Contr. U. S. Nat. Herb. 8: 31. 1903.

Type from Colima; a fruiting specimen from Jalisco also may belong here.

Tree, 6 meters high, the trunk 7.5 to 12.5 cm. in diameter; pinnae 25 pairs or fewer, the leaflets numerous, linear, 4 mm. long; flowers sweet-scented, the spikes 10 to 12 cm. long; fruit flat, about 11 cm. long and 2 cm. wide, very thin.

25. Acacia millefolia S. Wats. Proc. Amer. Acad. 21: 427. 1886.

Chihuahua to Sinaloa; type from Hacienda San José, southwestern Chihuahua. Southern Arizona.

Shrub, 3 meters high. with very short spines; leaflets numerous, linear, 3 to 7 mm. long; fruit 10 to 15 cm. long.

26. Acacia rotundata Benth. Trans. Linn. Soc. Bot. 30: 521. 1875.

Type from somewhere in Mexico; species not seen by the writer.

Pinnae 1 to 3 pairs; leaflets few, oblong-linear; spikes lax, about 2.5 cm. long.

27. Acacia gaumeri Blake, Proc. Biol. Soc. Washington 34: 44. 1921.

Known only from Yucatán, the type locality.

Tree, 8 meters high; pinnae 4 pairs; leaflets 9 to 16 pairs, oblong, appressed-pubescent beneath; spikes paniculate, 1 to 1.5 cm. long; ovary pilose.

28. Acacia dolichostachya Blake, Proc. Biol. Soc. Washington 34: 43. 1921.

Type from Yucatán.

Stems unarmed, glabrous; pinnae 5 pairs; leaflets 24 to 29 pairs, linear-oblong, about 3.5 mm. long; spikes 3 to 3.5 cm. long; ovary glabrous.

29. Acacia compacta Rose, Contr. U. S. Nat. Herb. 8: 31. 1903.

Known only from the type locality, Tomellín Canyon. Oaxaca.

Shrub, 2 to 3 meters high; pinnae 2 to 5 pairs; flowers yellow, the spikes dense, 2.5 to 3 cm. long; fruit flat, 10 cm. long, 1.5 cm. wide.

30. Acacia mammifera Schlecht. Linnaea 12: 563. 1838.

Known only from the type locality, Barranca de Acholoya.

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Glabrate unarmed shrub; pinnae 2 to 4 pairs, the leaflets narrowly elliptic. puberulent; spikes 2.5 to 5 cm. long; fruit flat, 7.5 to 15 cm. long, 8 mm. wide.

31. Acacia coulteri Benth.; A. Gray, Pl. Wright. 1: 66. 1852.

Sonora to Tamaulipas and Hidalgo; type from Zimapán, Hidalgo.

Slender shrub or tree, 3 to 10 meters high, unarmed or nearly so, the trunk sometimes 60 cm. in diameter; leaflets 4 to 6 mm. long; flowers whitish, in long slender spikes; fruit about 15 cm. long and 2 cm. wide, flat. "Tepeguaje" (Durango); "palo de arco," "huajillo" (Tamaulipas).

Wood very hard; used for tool handles, general construction, and fuel.

32. Acacia acatlensis Benth. Lond. Journ. Bot. 1: 513. 1842.

Acacia sericea Mart. & Gal. Bull. Acad. Brux. 10[2]: 309. 1843.

Acacia pueblensis T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 85. 1910.

Jalisco to Oaxaca, Veracruz, and Yucatán; type from Acatlán.

Tree, 3 to 8 meters high, armed with short stout spines, or sometimes unarmed; leaflets oblong-linear, 2 to 5 mm. long; flowers white, in long spikes. "Guayolote" (Michoacán).

33. Acacia glandulifera S. Wats. Proc. Amer. Acad. 25: 147. 1890.

Coahuila; type from Carneros Pass.

Shrub, about 60 cm. high; spines stout, about 1 cm. long; leaflets few, 2 to 3 mm. long; flower heads 5 to 7 mm. in diameter; fruit 6 to 8 cm. long, about 7 mm. wide, very rough.

34. Acacia biaciculata S. Wats. Proc. Amer. Acad. 21: 452. 1886.

Chihuahua; type from sandy plains near the city of Chihuahua.

Shrub, the prostrate branches a meter long or shorter; spines very slender, 1 to 1.5 cm. long; leaflets few, 3 to 4 mm. long; flowers orange, in small long-pedunculate heads; fruit 3 to 4 cm. long, 4 mm. wide, compressed, falcate, pubescent.

35. Acacia constricta Benth.; A. Gray, Pl. Wright. 1: 66. 1852.

Sonora to Tamaulipas, Puebla, and Zacatecas, on dry plains and hillsides, often forming extensive thickets. Western Texas (type locality) to southern Arizona.

Shrub, 1 to 6 meters high, with reddish brown branches; spines 1 to 2.5 cm. long; leaflets mostly 2 to 3 mm. long; flowers yellow, sweet-scented; fruit 6 to 12 cm. long, 3 to 4 mm. wide, constricted between the seeds. "Huisache" (Zacatecas, Coahuila, etc.); "gigantillo," "vara prieta," "chaparro prieto" (Durango, *Patoni*); "largoncillo" (Chihuahua).

36. Acacia vernicosa Standl. Contr. U. S. Nat. Herb. 20: 187. 1919.

Sonora and Chihuahua to Zacatecas and Querétaro; type from Santa Rosalia, Chihuahua. Western Texas to southern Arizona.

Shrub, 1 to 2 meters high, similar to the preceding species.

37. Acacia farnesiana (L.) Willd. Sp. Pl. 4: 1083. 1806.

Mimosa farnesiana L. Sp. Pl. 521. 1753.

Vachellia farnesiana Wight & Arn. Prodr. Fl. Ind. Orient. 272. 1834.

Nearly throughout Mexico. Widely distributed in tropical and subtropical regions of both hemispheres; probably adventive in the Old World; type from Santo Domingo.

Shrub or tree, 1 to 9 meters high, the short trunk sometimes 45 cm. in diameter, the branches spreading or drooping; bark thin, peeling off in long, reddish brown scales; spines 1 to 2.5 cm. long; leaflets 2 to 6 mm. long; flowers bright yellow, very sweet-scented; fruit dark brown or purplish; wood hard, close-grained, brownish red to yellow, its specific gravity about 0.83. "Binorama" or "vinorama" (Sonora, Baja California, Sinaloa); "huisache" or "huizache"

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(Nuevo León, Tamaulipas, Jalisco, Querétaro, Durango, Coahuila, Texas, etc.; from the Nahuatl *huitz-axin*); "guisache yondiro" (Michoacán, Guerrero); "quisache" (Chiapas); "huisache de la semilla," "huixachin," "uisatsin" (Morelos, Oaxaca, *Seler*); "xkantiriz" (Yucatán, Maya); "matitas" (*Ramírez*); "fiñisachi" (Guanajuato, *Dugès*); "bihi" (Oaxaca, Zapotec, *Reko*); "espino" (Oaxaca); "aroma" or "aromo" (Yucatán, Nicaragua, Costa Rica, Porto Rico, Colombia, Peru, Philippines, etc.); "zubin," "zubin-ché" (Yucatán, Maya, *Seler*); "gabia" or "gavia" (Durango, *Patoni*); "subin" (Honduras *Pittier*); "aroma amarilla" (Cuba); "espino blanco" (Guatemala, El Salvador); "cachito de aroma" (Nicaragua); "cují" (Venezuela); "cují cimarrón," "pelá," "uña de cabra" (Colombia); "espinillo" (Argentina, Uruguay). Known in the southern United States as "opoponax."

In many parts of Mexico the plant is found chiefly about dwellings and seems to be naturalized, but in other regions it appears to be native. The wood is used for many purposes. The bark and fruit contain tannin and are used for tanning and dyeing, and the fruit is often used for making ink. The viscous juice of the pods is employed in some places for mending broken china. The gum which exudes from the trunk is employed locally in making mucilage; it is very similar to gum arabic. The leaves are of value as forage for stock, especially in winter. In southern Europe the plant is cultivated extensively for the flowers (known in commerce as cassie flowers), from which perfume is manufactured. As much as 100,000 pounds of them are harvested annually about Grasse, France. In tropical America the flowers are often laid among linen to impart their perfume to it. An ointment made from the flowers is used in Mexico as a remedy for headache, and their infusion for dyspepsia. The green fruit is very astringent, and a decoction is employed for dysentery, inflammation of the skin and mucous membrane, etc. Seler reports even that in San Luis Potosí a decoction of the roots is employed as a supposed remedy for tuberculosis. The pulverized dried leaves are sometimes applied as a dressing to wounds.

This is probably the plant reported from Baja California by Clavigero as "huisache." The pods, he states, were used there for making ink. Cattle, he says, are fond of the tender branches, but these impart a bad flavor to their flesh.

38. **Acacia tortuosa** (L.) Willd. Sp. Pl. 4: 1083. 1806.

Mimosa tortuosa L. Syst. Nat. ed. 10. 1312. 1759.

Prosopis microphylla H. B. K. Nov. Gen. & Sp. 6: 308. 1823.

Acacia subtortuosa Shafer in Britton, N. Amer. Trees 524. *f. 485.* 1908.

Durango to Tamaulipas, Hidalgo, and Colima. Western Texas; West Indies.

Shrub or tree, 1 to 6 meters high, the trunk sometimes 15 cm. in diameter; bark deeply fissured, blackish brown; spines 1 to 2 cm. long, whitish; pinnae 3 or 4 pairs, the leaflets 2 to 4 mm. long; flowers yellow, sweet-scented, the heads about 1 cm. in diameter; fruit reddish brown. "Huisache" (Durango, Aguascalientes); "huisache chino" (Jalisco).

39. **Acacia pennatula** (Schlecht. & Cham.) Benth. Lond. Journ. Bot. 1: 390. 1842.

Inga pennatula Schlecht. & Cham. Linnaea 5: 593. 1830.

Sonora to Tamaulipas and Chiapas; type from Hacienda de la Laguna, Veracruz. Guatemala and Nicaragua.

Shrub or tree, 3 to 6 meters high, copiously pubescent; spines short and stout; pinnae very numerous, the leaflets crowded, 1 to 2 mm. long; flowers yellow or orange, very fragrant, in rather large heads; fruit 7 to 13 cm. long, compressed, dark brown, with very thick hard valves. "Tepame" (Jalisco);

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"quisache tepano" (Michoacán, Guerrero); "algarroba" or "algarrobo" (Sonora, Oaxaca); "espino" (Sinaloa).

The bark is sometimes employed as a remedy for indigestion, and the wood for making charcoal.

40. Acacia crassifolia A. Gray, Mem. Amer. Acad. **5**: 317. 1854.

Coahuila and San Luis Potosí; type from La Peña, Coahuila.

Branches reddish brown, glaucous when young, armed with few very small spines; leaflets rounded or subrenform, 2 to 5 cm. wide, glabrous, very thick, with prominent venation; heads racemose; fruit thick, about 7 cm. long and 2 cm. wide, slightly curved, glaucous.

41. Acacia rosei Standl. Contr. U. S. Nat. Herb. **20**: 187. 1919.

Sinaloa; type locality, Mazatlán.

Pinnae 2 pairs, the leaflets oval, 2 to 4.5 cm. long, thin, glabrate; flowers white; fruit flat, very thin, about 1 cm. wide. "Day."

42. Acacia crinita T. S. Brandeg. Zoe **5**: 198. 1905.

Sonora and Sinaloa; type from Culiacán.

Low shrub, the stems covered with stiff yellowish hairs 5 mm. long; leaflets oval, 1.2 to 2 cm. long, glabrous, pale beneath; flowers white.

43. Acacia anisophylla S. Wats. Proc. Amer. Acad. **21**: 452. 1886.

Known only from the type locality, mountain canyons near Jimulco, Coahuila.

Small tree, sparsely armed with short straight spines; pinnae 1 to 3 pairs, the leaflets 4 to 7 pairs, oblong, 6 to 14 mm. long; fruit compressed but very thick, 10 to 12 cm. long, somewhat glaucous.

44. Acacia polypodioides Standl. Contr. U. S. Nat. Herb. **20**: 184. 1919.

Oaxaca and Chiapas; type from Chiapa, Chiapas. Nicaragua.

Unarmed shrub, copiously pilose; leaflets numerous, 3 to 5 mm. long; flowers white; fruit flat, thin, 8 to 11 mm. wide, pubescent.

45. Acacia leucothrix Standl. Contr. U. S. Nat. Herb. **20**: 185. 1919.

Tamaulipas and San Luis Potosí; type from San Dieguito, San Luis Potosí.

Shrub, copiously hirsute; leaflets few, about 3 mm. long; flowers white, the heads axillary, slender-pedunculate; fruit flat, thin, about 4.5 cm. long and 7 mm. wide, brown, glabrate.

46. Acacia villosa (Swartz) Willd. Sp. Pl. **4**: 1067. 1806.

Mimosa villosa Swartz, Fl. Ind. Occ. **2**: 982. 1800.

Acacia hirsuta Schlecht. Linnaea **12**: 572. 1838.

? *Acacia stipellata* Schlecht. Linnaea **12**: 574. 1838.

Coahuila and Nuevo León to Oaxaca and Chiapas. West Indies and Central America; southern United States; type from Jamaica.

Erect unarmed shrub, pubescent or glabrate; leaflets linear, 3 to 5 mm. long; flowers white; fruit flat, thin.

47. Acacia filicioides (Cav.) Trel. Rep. Ark. Geol. Surv. **1888**[4]: 178. 1891.

Mimosa filicioides Cav. Icon. Pl. **1**: 55. *pl.* 78. 1791.

Acacia filicina Willd. Sp. Pl. **4**: 1072. 1806.

Acacia carbonaria Schlecht. Linnaea **12**: 571. 1838.

Guerrero to Veracruz; type from somewhere in Mexico.

Shrub, more or less hirsute throughout; leaflets oblong-linear, 3 to 5 mm. long; flowers white; fruit flat, thin, about 5 cm. long and 1 cm. wide.

It is possible that the name *filicioides* really applies to the plant here listed as *A. villosa*, but Cavanilles's plate seems to agree better with the present plant.

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48. Acacia elegans Schlecht. Linnaea **12**: 569. 1838.

Tepic to Guerrero and Morelos; type from Regla, Hidalgo.

Shrub or small tree, 2.5 to 5 meters high, unarmed; leaflets linear, 3 to 5 mm. long; flowers white; fruit thin, flat, straight, about 1 cm. wide.

49. Acacia cuspidata Schlecht. Linnaea **12**: 573. 1838.

Chihuahua to Zacatecas and Puebla; type collected near Mexico City. Texas to Arizona.

Low shrub, unarmed; leaflets oblong, 2 to 4 mm. long; flowers white; fruit thin, flat, about 6 mm. wide, brown.

It is not certain that the name *cuspidata* really belongs to the plant to which it is applied here.

50. Acacia angustissima (Mill.) Kuntze, Rev. Gen. Pl. 3^3: 47. 1898.

Mimosa angustissima Mill. Gard. Dict. ed. 8. *Acacia* no. 19. 1768.

Acacia glabrata Schlecht. Linnaea **12**: 569. 1839.

Acacia elegans Mart. & Gal. Bull. Acad. Brux. 10^2: 312. 1843.

Acacia insignis Mart. & Gal. Bull. Acad. Brux. 10^2: 315. 1843.

Distributed almost throughout Mexico; type from Campeche. Central America; southern United States.

Shrub or small tree, 2 to 4 meters high, unarmed, pubescent or glabrate; leaflets mostly 3 to 5 mm. long; flowers white, the heads axillary or racemose; fruit thin, flat, brown. The following names are reported for this and the closely related species (nos. 42–48): "Xaax" (Yucatán, Maya); "timbe" (Baja California, Oaxaca, San Luis Potosí); "cantemó" (Tabasco); "guajillo" (Sinaloa); "palo de pulque" (Oaxaca).

In Oaxaca the bark is used for tanning skins and for inducing fermentation in *tepache*.

51. Acacia laevis Standl. Contr. U. S. Nat. Herb. **20**: 185. 1919.

Known only from the type locality, near Guadalajara, Jalisco.

Plants glabrous, unarmed; leaflets numerous, 4 to 5 mm. long, pale beneath; flower heads in long racemes.

52. Acacia penicillata Standl. Contr. U. S. Nat. Herb. **20**: 185. 1919.

Jalisco and Oaxaca; type from Cerro de San Felipe, Oaxaca.

Pinnae 3 to 5 pairs, the leaflets 8 to 13 mm. long; flower heads racemose, about 2 cm. in diameter; fruit flat, about 8 cm. long and 1.2 cm. wide, glabrous, glaucescent.

53. Acacia tequilana S. Wats. Proc. Amer. Acad. **22**: 409. 1887.

Durango, Jalisco, and San Luis Potosí; type from Tequila, Jalisco.

Glabrous shrub, 1.5 to 3 meters high, unarmed; leaflets 0.8 to 2.5 cm. long; flowers white, the heads in long naked racemes; fruit 4.5 cm. long and nearly 1 cm. wide, flat, thin, glaucescent.

54. Acacia paniculata Willd. Sp. Pl. **4**: 1074. 1806.

Acacia picachensis T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 179. 1915.

Michoacán to Oaxaca. West Indies and South America; type from Brazil.

Shrub or small tree, sometimes scandent, armed with short recurved spines; leaflets very numerous, 3 to 5 mm. long, glabrous; flowers white; fruit flat, 8 to 15 cm. long, 2 to 2.5 cm. wide, brown, glabrous. "Rabo de iguana" (Michoacán, Guerrero); "rabo de lagarto," "espino" (Oaxaca); "tocino" (Cuba).

55. Acacia berlandieri Benth. Lond. Journ. Bot. **1**: 522. 1842.

Acacia tephroloba A. Gray, Pl. Wright. **1**: 65. 1852.

Coahuila to Veracruz and Querétaro; type from Nuevo León. Western Texas.

Shrub, 1 to 4.5 meters high, pubescent, armed with short spines; leaflets numerous, 3 to 6 mm. long; flowers white, sweet-scented; fruit flat, 9 to 16 cm. long, 2 to 3 cm. wide, straight or curved, very densely velvety-puberulent.

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"Huajillo" (Coahuila, Tamaulipas, Nuevo León, Texas; sometimes written "huajilla" or "guajilla"); "mimbre," "matorral" (Tamaulipas).

Wood sometimes used for tool handles and other small objects, also for fuel.

56. Acacia glomerosa Benth. Lond. Journ. Bot. 1: 521. 1842.

Veracruz. Central America and South America.

Shrub or small tree, often scandent, armed with numerous very short spines; leaflets numerous, about 1 cm. long; flower heads small, numerous, racemose-paniculate.

Acacia laccifera Villada (Naturaleza II. 2: 487. *pl. 30.* 1896) is probably a synonym of this species.

57. Acacia subangulata Rose, Contr. U. S. Nat. Herb. 5: 194. 1899.

Puebla and Oaxaca; type from limestone hills near Tehuacán, Puebla.

Tree, 4.5 to 6 meters high, armed with short stout straight spines; leaflets numerous, 7 to 13 mm. long; flower heads mostly racemose-paniculate; fruit about 10 cm. long and 2.5 cm. wide.

58. Acacia riparia H. B. K. Nov. Gen. & Sp. 6: 276. 1823.

Sinaloa to Guerrero, San Luis Potosí, and Yucatán. West Indies, Central America, and South America; type from Brazil.

Scandent shrub, armed with short recurved spines; leaflets 5 to 7 mm. long; flowers yellowish white; fruit about 9 cm. long and 2 cm. wide, flat, often glaucescent. "Tlahuitol" (San Luis Potosí, *Urbina*); "zarza" (Porto Rico); "rasga-rasga," "panelo," "toldillo" (Colombia); "yax-catzim" (Yucatán, Maya); "gatuño blanco" (Sinaloa).

59. Acacia palmeri S. Wats. Proc. Amer. Acad. 17: 350. 1882.

Known only from the type locality, in the Sierra Madre south of Saltillo, Coahuila.

Shrub, nearly glabrous, armed with short spines; pinnae 1 or 2 pairs, the leaflets 6 to 8 mm. long; flower heads axillary.

60. Acacia malacophylla Benth.; A. Gray, Pl. Wright. 1: 64. 1852.

Coahuila and Nuevo León. Western Texas (type locality).

Shrub, armed with short spines; leaflets about 7 mm. long; fruit flat, about 8 cm. long and nearly 2 cm. wide, glabrous.

61. Acacia purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. 3: 380. 1909.

Known only from the type locality, San Luis Tultitlanapa, Puebla.

Shrub, armed with short stout recurved spines; leaflets about 8 mm. long, glabrate, with prominent venation; fruit about 8 cm. long and 2 cm. wide, falcate, stipitate, glabrate.

62. Acacia occidentalis Rose, Contr. U. S. Nat. Herb. 8: 32. 1903.

Sonora (type locality) and Sinaloa; perhaps also in Chihuahua.

Shrub or tree, 2 to 12 meters high, armed with short stout dark spines; leaflets 2 to 3 mm. long; flowers white or nearly so; fruit thin, flat, about 7 cm. long and 2 cm. wide. "Désota" (tésota ?) (Sonora).

63. Acacia micrantha Benth. Trans. Linn. Soc. Bot. 30: 526. 1875.

Tamaulipas and San Luis Potosí.

Shrub, armed with short spines; leaflets 7 to 11 mm. long; flower heads slender-pedunculate, axillary or racemose; fruit flat, thin, about 6 cm. long and 1.8 cm. wide, glabrous, rounded at apex.

64. Acacia roemeriana Scheele, Linnaea 21: 456. 1848.

Chihuahua and Coahuila; Baja California. Western Texas (type locality).

Shrub, 1 to 2 meters high, armed with short, mostly recurved spines; leaflets 7 to 15 mm. long; flower heads mostly axillary; fruit flat, thin, about 7 cm. long and 1.5 cm. wide, often falcate, glabrous.

This is considered a valuable honey plant in western Texas.

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DOUBTFUL SPECIES.

ACACIA CYLINDRIFLORA Mart. & Gal. Bull. Acad. Brux. 10 [2]: 313. 1843. Type from Oaxaca. Probably a *Mimosa*.

ACACIA FEROX Mart. & Gal. Bull. Acad. Brux. 10 [2]: 314. 1843.

ACACIA LANATA Mart. & Gal. Bull. Acad. Brux. 10 [2]: 315. 1843. Type from Mixteca Alta.

ACACIA MOLLICULA Mart. & Gal. Bull. Acad. Brux. 10 [2]: 315. 1843. Type from Tehuacán, Puebla. Flowers said to be pink. Probably of some other genus.

10. CALLIANDRA Benth. in Hook. Journ. Bot. 2: 138. 1840.

Unarmed shrubs or small trees, or sometimes herbs; leaves bipinnate, the leaflets small or large; stipules usually persistent; flowers in dense heads, often rather large and showy, red or white, the stamens long-exserted; fruit flat, usually straight, the valves recurved after dehiscence.

The names "plumita" (Oaxaca) and "gavia" (Durango) are reported for undetermined species of the genus.

Leaflets 2 to 4 to each pinna, mostly 2 to 7 cm. long; pinnae usually 2 pairs.
- Leaflets pinnately nerved, lanceolate or narrowly lanceolate.....1. C. laevis.
- Leaflets palmately nerved, with 2 or more distinct nerves rising from the base.
  - Corolla pubescent.....2. C. canescens.
  - Corolla glabrous.....3. C. emarginata.

Leaflets 5 to many to each pinna, often very small; pinnae 1 to many pairs.
- Heads of flowers in long terminal racemes; flowers pedicellate; filaments red or purple.
  - Leaflets not falcate, rounded or very obtuse at apex; pinnae usually 15 to 20 pairs.
    - Corolla appressed-pilose.....4. C. anomala.
    - Corolla glabrous.....5. C. calothyrsus.
  - Leaflets falcate, usually acute; pinnae usually 7 to 12 pairs.
    - Corolla about 16 mm. long, white outside with dense appressed hairs. 6. C. palmeri.
    - Corolla 5 to 11 mm. long, not white outside, the pubescence mostly of brownish hairs.....7. C. houstoniana.
- Heads of flowers mostly axillary, never racemose; flowers sessile or nearly so.
  - Pinnae one pair, the leaflets large, 1 to 2.5 cm. wide.....9. C. conzattii.
  - Pinnae 2 or more pairs, or if a single pair the leaflets 5 mm. wide or narrower.
    - Leaflets variously pubescent beneath.
      - Leaflets large, most of them 0.8 to 2.5 cm. wide, membranaceous. 17. C. penduliflora.
      - Leaflets small, less than 5 mm. wide, often coriaceous.
        - Plants low, less than 20 cm., woody only at the base. 16. C. humilis.
        - Plants usually large, woody throughout.
          - Leaflets oval or obovate-oval.....18. C. malacophylla.
          - Leaflets oblong or narrowly oblong.
            - Pinnae usually 8 to 10 pairs; leaflets somewhat tomentose beneath with somewhat matted, curled hairs.....8. C. nitida.
            - Pinnae 1 to 6 pairs; leaflets pilose beneath with mostly straight appressed hairs.
              - Corolla glabrous or nearly so, greenish.
                - Pinnae 1 or 2 pairs; leaflets 6 to 10 pairs.....20. C. angelica.
                - Pinnae 4 to 6 pairs; leaflets 20 or more pairs.....21. C. laxa.

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Corolla copiously pubescent, usually purple.
Corolla 4 to 4.5 mm. long.....10. C. eriophylla.
Corolla 6 to 7 mm. long.
Leaflets usually 8 to 10 pairs, oblong..11. C. californica.
Leaflets usually 12 to 20 pairs, narrowly oblong.
Pods densely pubescent with spreading hairs; pinnae usually 3 or 4 pairs.....12. C. cumingii.
Pods sparsely pubescent with appressed hairs; pinnae 4 to 6 pairs.....13. C. peninsularis.
Leaflets glabrous beneath, but often ciliate.
Plants low, usually less than 20 cm. high, woody only at the base.
Pinnae 2 to 4 pairs; leaflets oval or broadly oblong, not conspicuously if at all ciliate.....15. C. reticulata.
Pinnae 5 to 9 pairs; leaflets oblong or narrowly oblong, often long-ciliate.....16. C. humilis.
Plants usually tall shrubs, often woody throughout.
Pinnae a single pair in all the leaves; leaflets very small, oval or obovate-oval..... 19. C. unijuga.
Pinnae 2 or more pairs in all or most of the leaves (rarely a single pair, the leaflets then oblong).
Leaflets coriaceous; calyx shallowly dentate.....14. C. bijuga.
Leaflets membranaceous; calyx deeply lobate.
Branches quadrangular .....22. C. tetragona.
Branches terete.
Pinnae 2 pairs in most of the leaves.
Leaflets usually 10 to 13 pairs, oblong or narrowly oblong. 23. C. oaxacana.
Leaflets usually 5 to 7 pairs, oval to broadly oblong. 24. C. formosa.
Pinnae 3 or more pairs in most of the leaves.
Leaflets usually 8 to 15 pairs or more, 2 to 6 mm. wide. 25. C. portoricensis.
Leaflets 3 to 6 pairs, 10 to 20 mm. wide.....26. C. capillata.

1. **Calliandra laevis** Rose, Contr. U. S. Nat. Herb. 5: 194. 1899.
Sinaloa and Tepic; type from Colomas, Sinaloa.
Shrub; leaflets 4, lanceolate, 4.5 to 9 cm. long, bright green, glabrous.

2. **Calliandra canescens** (Schlecht. & Cham.) Benth. Lond. Journ. Bot. 3: 96. 1844.
Inga canescens Schlecht. & Cham. Linnaea 5: 592. 1830.
Calliandra purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 180. 1915.
Veracruz and Oaxaca; type collected near Puente del Rey. Guatemala.
Shrub, 1.5 to 2.5 meters high; leaflets 1 to 3.5 cm. long; flowers white.

3. **Calliandra emarginata** (Humb. & Bonpl.) Benth. Lond. Journ. Bot. 3: 95. 1844.
Inga emarginata Humb. & Bonpl.; Willd. Sp. Pl. 4: 1009. 1806.
Calliandra rupestris T. S. Brandeg. Zoe 5 :199. 1905.
Tamaulipas and Sonora to Oaxaca and Veracruz; type from Acapulco, Guerrero.
Shrub; leaflets 2 to 8.5 cm. long, very variable in shape, acute to rounded at apex; flowers purplish red or greenish; fruit about 12 mm. wide.
The specimens seen exhibit a large amount of variation, and it may be that several species are represented. Without more ample material it seems unwise to make any segregates.

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4. **Calliandra anomala** (Kunth) Macbride, Contr. Gray Herb, n. ser. **59**: 4. 1919.

Inga anomala Kunth, Mimos. Pl. Légum. 70. *pl. 22* 1819–24.

Acacia callistemon Schlecht. Linnaea **12**: 568. 1838.

Calliandra kunthii Benth. in Hook. Journ. Bot. **2**: 139. 1840.

Chihuahua to Sinaloa, Mexico, and Chiapas. Guatemala.

Shrub, 1 to 4.5 meters high, with blackish bark; leaflets very numerous, linear-oblong, 2.5 to 5 mm. long; flowers purple, showy; fruit densely hirsute or hispid. "Cabeza de ángel" (Mexico); "cabellos de ángel" (Guanajuato, Costa Rica, Guatemala, Honduras); "pambetano" (Morelos, Valley of Mexico, Veracruz); "cabellitos de ángel" (Morelos); "cabellitos de una vara" (Morelos, *Ramírez*); "hierba del ángel," "lele" (various localities, *Ramírez*); "tepachera" "timbrillo" (Valley of Mexico, *Ramírez*); "tepexiloxochitl" or "tepejiloxochitl" (=mountain+corn silk+flower), "texoxochitl" "tlacoxiloxochitl" (=rod or bush+corn silk+flower), "tlamacazatzotl," "tzonxochitl," "xiloxochitl," "xiloxochicuahuitl" (the shrub) (Nahuatl); "canela," "hierba de canela" (Oaxaca, *Reko*); "coquito" Oaxaca, *Seler*); "carboncillo" (Costa Rica); "cabellito" (Sinaloa).

The plant is sometimes used for tanning. The root is used to retard fermentation in a drink, "tepache," made from pulque and coarse sugar. The plant is said to contain a glucoside, calliandrine. In domestic medicine it is used for fevers, especially malaria, although experiments have indicated that its reputation for this purpose is not justified.

The plant is treated at length by Hernández[1] in a chapter entitled "De *Tlacoxiloxochitl* flore Barbato," which is accompanied by three good figures. His account is as follows: "*Tlacoxiloxochitl*, which some call *Tentzonxochitl* [=beard-flower], some *Tlamacazcatacotl* [=priest-bush], and others *Tepexiloxochitl* or *Tlalxilochtl* [=dwarf hair-flower], is a shrub with leaves like mesquite. The flowers are like long red hair, and they come from round reddish berries. The root is fibrous, yellow outside, and red within when it is cut. The stalks are red and the pods yellow. It grows in level or mountainous places and sometimes along streams. The root bark is dry and astringent and somewhat glutinous; its nature is hot, in the third order, and its flavor sharp. The flowers, crushed, mixed with water, and used as drops, are a wonderful remedy for diseases of the eye, for they correct inflammation and remove morbid growths, and heal ulcers. If the decoction or infusion of the juice is drunk, it stops diarrhoea and dysentery, stimulates the appetite, and relieves indigestion. There be those who say also that it soothes the chest, relieves the belly, removes the bile by vomiting, and is also a remedy for coughs."

This species has usually been known as *Calliandra grandiflora* (L'Hér) Benth., but as pointed out recently by Macbride[2] that name can scarcely apply to the common Mexican species. Macbride states that "There is no reasonable doubt but that it is rather referable to *C. houstoni* (L'Hér.) Benth.," but the same objections that prevent its application to the common Mexican plant also prevent its reference to synonomy under the latter species.

5. **Calliandra calothyrsus** Meissn. Linnaea **21**: 251. 1848.

Chiapas, Central America and northern South America; type from Surinam. Erect shrub, nearly glabrous; leaflets very numerous, 3 to 7 mm. long, linear.

6. **Calliandra palmeri** S. Wats. Proc. Amer. Acad. **22**: 410. 1887.

Known only from the type locality, Guadalajara, Jalisco.

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[1] Thesaurus 104. 1651.

[2] Contr. Gray Herb. n. ser. **59**: 5. 1919.

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Shrub, 1 to 1.5 meters high, the stems densely white-pilose; leaflets 6 to 8 mm. long, coriaceous, lustrous on the upper surface, white-pilose beneath.

7. **Calliandra houstoniana** (Mill.) Standl.

Mimosa houstoniana Mill. Gard. Dict. ed. 8. *Mimosa* no. 16. 1768.

Mimosa houstoni L'Hér. Sert. Angl. 30. 1788.

Acacia houstoni Willd. Sp. Pl. 4: 1062. 1806.

Acacia metrosideriflora Schlecht. Linnaea 12: 567. 1838.

Calliandra houstoni Benth. in Hook. Journ. Bot. 2: 139. 1840.

Sonora to Tamaulipas and Chiapas; type from Veracruz. Guatemala and Honduras.

Shrub or small tree, 1 to 6 meters high, pubescent or glabrate; bark red-brown; leaflets 4 to 7 mm. long, the upper surface with a metallic luster; flowers purplish red, large and showy; fruit about 1.5 cm. wide, densely brown-hirsute. "Charamusco" (Tabasco); "hierba burro" (Chiapas); "pambotano" (southern Mexico); "day," "tabardillo" (Sinaloa). Probably the names reported for *C. anomala* apply also to this species.

The same properties are attributed to this as to *C. anomala*. The bark is chewed to harden the gums (in Sinaloa). According to the U. S. Dispensatory, the root bark, under the name of "pambotano bark" (sometimes written erroneously as "pandotano") has been highly recommended in Europe as an antiperiodic. It is said also to contain an alkaloid which produces death by systolic arrest of the heart.

8. **Calliandra nitida** S. Wats. Proc. Amer. Acad. 22: 410. 1887.

Zacatecas, Jalisco, and Tepic; type from Río Blanco, Jalisco.

Shrub, 1 meter high or less, copiously pubescent; leaflets 4 to 7 mm. long, with a metallic luster; flowers purplish red. "Potosina" (Jalisco).

9. **Calliandra conzattii** Standl. Contr. U. S. Nat. Herb. 20: 188. 1919.

Known only from the type locality, Río de Pilas, Oaxaca, altitude 300 meters.

Leaflets 5 to 7, obliquely ovate or elliptic, 2.5 to 6 cm. long, acute or obtuse, bright green, glabrate; flowers very small, greenish.

Perhaps not of this genus but rather a *Pithecollobium*.

10. **Calliandra eriophylla** Benth. Lond. Journ. Bot. 3 : 105. 1844.

Calliandra chamaedrys Engelm.: A Gray, Mem. Amer. Acad. II. 4: 39. 1849.

Calliandra conferta Benth.; A. Gray, Pl. Wright. 1: 63. 1852.

Sonora to Coahuila and Puebla; type from Chila, Puebla. Western Texas to southern Arizona.

Shrub, commonly about 30 cm. high, usually densely branched, the branches stiff, gray; leaflets few, 3 to 4 mm. long; heads few-flowered, the flowers purple; fruit 5 mm. wide, pubescent.

11. **Calliandra californica** Benth. Bot. Voy. Sulph. 14. *pl. 11.* 1844.

Baja California, on dry stony hillsides, often abundant; type from Magdalena Bay.

Stiff, densely branched shrub, 1 to 2 meters high; leaflets 4 to 13 mm. long, thick, pale; flowers purplish red; fruit about 7 mm. wide.

12. **Calliandra cumingii** Benth. in Hook. Journ. Bot. 2: 140. 1840.

Calliandra cumingii galeottii Benth. Lond. Journ. Bot. 3: 106. 1844.

Inga speciosa Mart. & Gal. Bull. Acad. Brux. 10 [2]: 320. 1843.

Puebla and Oaxaca. Type from Colombia.

Shrub, 30 to 60 cm. high; leaflets 1 cm. long or shorter; flowers purplish red, the heads long-pedunculate.

The writer has seen no Colombian material, and it may be that the Mexican plant represents a different species. If so, the name published by Martens and Galeotti is available.

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13. Calliandra peninsularis Rose, Contr. U. S. Nat. Herb. **5**: 135. 1897.

Baja California; type from La Paz.

Densely branched shrub; leaflets 4 to 9 mm. long; flowers purple; fruit about 8 mm. wide. "Tabardillo," "zapotillo."

Roots used as a remedy for fevers.

14. Calliandra bijuga Rose, Contr. U. S. Nat. Herb. **5**: 135. 1897.

Jalisco to Veracruz and Chiapas; type from Acapulco, Guerrero.

Shrub or tree, the trunk sometimes attaining a diameter of 20 cm.; pinnae 1 or 2 pairs, the leaflets numerous, 7 to 16 mm. long, bright green, lustrous; flowers purple; fruit about 1 cm. wide.

Closely related to *C. magdalenae* (Bert.) Benth., and doubtfully distinct.

15. Calliandra reticulata A. Gray, Pl. Wright. **2**: 53. 1853.

Chihuahua to Jalisco and Puebla. Southern Arizona and New Mexico; type from Santa Rita, New Mexico.

Leaflets 4 to 10 mm. long, very thick, with prominent venation; flowers purple; fruit about 7 mm. wide, glabrous.

This and *C. humilis* are low plants, usually 10 to 20 cm. high, and scarcely deserve to be classed as shrubs, being herbaceous except at the base.

16. Calliandra humilis (Schlecht.) Benth. Lond. Journ. Bot. **5**: 103. 1846.

Acacia humilis Schlecht. Linnaea **12**: 567. 1838.

Calliandra herbacea Engelm.; A Gray, Mem. Amer. Acad. II. **4**: 39. 1849.

Sonora to Zacatecas and Jalisco; type from Regla, Hidalgo. Southern Arizona and New Mexico.

Leaflets 6 mm. long or shorter; fruit about 6 mm. wide, pubescent or glabrate.

17. Calliandra penduliflora Rose, Contr. U. S. Nat. Herb. **5**: 193. 1899.

Durango to Oaxaca and Veracruz; type from Bolaños, Jalisco.

Shrub, 1.5 to 4.5 meters high; leaflets mostly 1 to 3 cm. long, rounded at apex; flowers white, the heads slender-pedunculate, the stamens very long and slender; fruit 6 to 10 cm. long, about 7 mm. wide, glabrous.

18. Calliandra malacophylla Benth. Lond. Journ. Bot. **3**: 100. 1844.

Calliandra unijuga pueblensis Macbride, Contr. Gray. Herb. n. ser. **59**: 4. 1919.

Puebla and Oaxaca; type from Monte San Felipe.

Stiff, densely branched shrub with brownish bark; leaflets few, 5 to 7 mm. long, pubescent; flowers white.

19. Calliandra unijuga Rose, Contr. U. S. Nat. Herb. **50**: 193. 1899.

Puebla and Oaxaca; type from Cuicatlán, Oaxaca.

Shrub, 1 to 2.5 meters high.

Very similar to the last species except in the lack of pubescence, and probably only a form of it. The two plants sometimes grow together, for on one sheet examined (*Rose* 9885, from Puebla) both are associated under the same number.

20. Calliandra angelica Benth. Lond. Journ. Bot. **3**: 100. 1844.

Known only from the type locality, Regla, Hidalgo.

Not seen by the writer. Vernacular name given as "cabellito de ángel."

21. Calliandra laxa Benth. Trans. Linn. Soc. Bot. **30**: 551. 1875.

Acacia laxa Willd. Sp. Pl. **4**: 1069. 1806.

Acacia rubescens Mart. & Gal. Bull. Acad. Brux. **10**[2]: 315. 1843.

Calliandra xalapensis Benth. Lond. Journ. Bot. **3**: 106. 1844.

Veracruz to Guerrero and Oaxaca. Northern South America; type from Venezuela.

Erect shrub, pubescent or glabrate; leaflets 4 to 7 mm. long; flowers white.

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22. Calliandra tetragona (Willd.) Benth. in Hook. Journ. Bot. **2**: 139. 1840.

Acacia tetragona Willd. Sp. Pl. **4**: 1069. 1806.

Michoacán to Chiapas. Central America and northern South America; type from Caracas.

Shrub or small tree, 1.5 to 4.5 meters high; leaflets numerous, 4 to 10 mm. long, bright green; flowers white; fruit about 1 cm. wide.

23. Calliandra oaxacana Rose, Contr. U. S. Nat. Herb. **5**: 193. 1899.

Zacatecas to Oaxaca; type from Tomellín Canyon, Oaxaca.

Shrub 1 to 1.5 meters high; leaflets numerous, 4 to 11 mm. long; flowers white or pink.

24. Calliandra formosa (Kunth) Benth. Lond. Journ. Bot. **3**: 98. 1844.

Acacia formosa Kunth, Mimos. Pl. Légum. 102. *pl. 32*. 1819–24.

Acacia gracilis Mart. & Gal. Bull. Acad. Brux. **10**[2]: 311. 1843.

Calliandra coulteri S. Wats. Proc. Amer. Acad. **17**: 352. 1882.

Baja California to Chihuahua, Colima, and Yucatán.

Shrub or small tree, nearly glabrous; leaflets 0.5 to 2.5 cm. long, bright green; flowers white. "Tepeguaje" (Guanajuato).

C. coulteri may be distinct, but probably is not. The name "ébano" is reported as applied to this species, but the writer is doubtful whether the plant so referred to (said to be a large tree) is correctly identified.

25. Calliandra portoricensis (Jacq.) Benth. Lond. Journ. Bot. **3**: 99. 1844.

Mimosa portoricensis Jacq. Icon. Pl. Rar. **3**: 20. *pl. 633*. 1793.

Sinaloa to San Luis Potosí, Yucatán, and Oaxaca. Widely distributed in tropical America; type from Porto Rico.

Shrub or small tree, 1 to 4.5 meters high, nearly glabrous; leaflets 1.8 cm. long or shorter, thin, bright green; flowers pink or white; fruit about 8 mm. wide, glabrous. "Pich" (Yucatán, Maya); "moruro de costa," "soplillo" (Cuba); "cojobillo," "acacia," "zarza boba" (Porto Rico); "granolino" (Santo Domingo).

26. Calliandra capillata Benth. Lond. Journ. Bot. **3**: 98. 1844.

Guerrero and Puebla to Chiapas; type from Mount San Felipe, Oaxaca. Reported from Guatemala.

Shrub, 1 to 2.5 meters high, glabrous; leaflets few, 1.2 to 4 cm. long, thin, bright green; flowers white or pink.

DOUBTFUL SPECIES.

CALLIANDRA HIRSUTA (Don) Benth. Trans. Linn. Soc. Bot. **30**: 554. 1875. *Inga hirsuta* Don, Hist. Dichl. Pl. **2**: 395. 1832. Believed to have come from Mexico.

CALLIANDRA LAMBERTIANA (Don) Benth. Lond. Journ. Bot. **3**: 100. 1844. *Acacia lambertiana* Don in Lindl. Bot. Reg. **9**: *pl. 721*. 1823. Described from cultivated plants said to have come from Mexico. Perhaps the same as *C. laxa*.

CALLIANDRA TETRAPHYLLA (Don) Benth. Trans. Linn. Soc. Bot. **30**: 544. 1875. *Inga tetraphylla* Don, Hist. Dichl. Pl. **2**: 392. 1832. Described from Mexico.

CALLIANDRA FULGENS Hook. f. in Curtis's Bot. Mag. **124**: *pl. 7626*. 1898. Described from cultivated plants believed to have come from Mexico. Apparently related to *C. emarginata*, but with more numerous (6) leaflets.

11. LYSILOMA Benth. Lond. Journ. Bot. 3: 82. 1844.

Unarmed trees or shrubs; leaves bipinnate, with few and large or usually numerous and small leaflets; flowers small, capitate or spicate; fruit flat, broad, the valves thin, separating from the persistent margin.

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Flowers in spikes.....1. L. acapulcensis.
Flowers in globose heads.
Pinnae 1 or 2 pairs.
Leaflets usually 3 to each pinna, 4 to 9 cm. long; stipules persistent, large. 2. L. tergemina.
Leaflets numerous, 2 cm. long or shorter; stipules minute, deciduous. 3. L. candida.
Pinnae 3 to many pairs.
Pinnae 20 to 25 pairs.....4. L. aurita.
Pinnae 3 to 13 pairs.
Leaflets oval, 8 to 12 mm. wide.....9. L. sabicu.
Leaflets oblong, less than 5 mm. wide.
Leaflets pubescent beneath.
Leaves pubescent with appressed hairs.....5. L. microphylla.
Leaves hirtellous with spreading hairs.....6. L. watsoni.
Leaflets glabrous beneath.
Pinnae 6 to 13 pairs; leaflets 7 mm. long or shorter. 7. L. divaricata.
Pinnae usually 3 or 4 pairs; leaflets about 10 mm. long. 8. L. bahamensis.

1. **Lysiloma acapulcensis** (Kunth) Benth. Lond. Journ. Bot. 3: 83. 1844.

Acacia acapulcensis Kunth, Mimos. Pl. Légum. 78. *pl. 24.* 1819–24.

Acacia desmostachya Benth. Pl. Hartw. 13. 1839.

Lysiloma desmostachya Benth. Lond. Journ. Bot. 3: 84. 1844.

Lysiloma acapulcensis brevispicata Rose, Contr. U. S. Nat. Herb. 1: 100. 1891.

Sonora to San Luis Potosí and Chiapas; type from Acapulco. Guerrero. Guatemala.

Shrub or tree, sometimes 15 meters high, with very hard wood; leaves pubescent, at least when young, the leaflets very numerous, linear-oblong, 8 mm. long or shorter; stipules large, sometimes persistent; spikes 4 to 6 cm. long; fruit 2.5 to 4.8 cm. wide. "Tepeguaje" or "tepehuaje" (Michoacán, Guerrero, Oaxaca, Sinaloa, Veracruz, Sonora); "tepeoaxin" (*Ramírez*); "laaguia" (Oaxaca, Zapotec, *Reko*).

The bark is astringent and is used in domestic medicine. It is sometimes chewed to harden the gums. The gum which exudes from the bark is used like gum arabic.

L. acapulcensis brevispicata Rose, from Sonora, differs only in its short spikes.

2. **Lysiloma tergemina** Benth. Trans. Linn. Soc. Bot. 30: 534. 1875.

Guerrero, Morelos, and Puebla; type from Acatlán, Puebla.

Small tree, 3 to 4.5 meters high; leaflets obliquely oval, rounded or obtuse at apex, bright green, glabrous; stipules reniform; flowers white; fruit 10 to 15 cm. long, 3.5 to 4.5 cm. wide, glaucescent.

3. **Lysiloma candida** T. S. Brandeg. Proc. Calif. Acad. II. 2: 153. 1889.

Southern Baja California, in canyons and on rocky slopes; type from Purísima.

Tree, sometimes 7.5 meters high, with a trunk 15 to 30 cm. in diameter (often with several trunks), the bark smooth, white; leaflets oblong or oval, obtuse or rounded at apex; stamens yellow; fruit 8 to 15 cm. long, 2.5 to 3 cm. wide, the valves thin and papery. "Palo blanco."

The bark is much used locally for tanning, and is an article of export. For an illustration of a grove of the trees see Contr. U. S. Nat. Herb. 16: *pl. 113.*

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4. **Lysiloma aurita** (Schlecht.) Benth. Lond. Journ. Bot. 3: 83. 1844.

Acacia aurita Schlecht. Linnaea 12: 572. 1838.

Veracruz and Chiapas; type from Malpais de Naulinco, Veracruz. Guatemala and Nicaragua.

Leaves pubescent, the leaflets about 3 mm. long; fruit 10 to 12 cm. long, 2 to 2.5 cm. wide, dark reddish brown.

5. **Lysiloma microphylla** Benth. Lond. Journ. Bot. 3: 83. 1844.

Guanajuato to Chiapas; type from Léon, Guanajuato.

Tree, 9 meters high; leaflets 4 to 6 mm. long; fruit about 13 cm. long and 2.5 cm. wide.

Most of the material recently referred to this species is rather *L. divaricata*, if Bentham's descriptions are reliable.

6. **Lysiloma watsoni** Rose, Contr. U. S. Nat. Herb. 1: 99. 1891.

Known only from the vicinity of the type locality, Alamos, Sonora.

Shrub or small tree, 3 meters high, the trunk 7.5 cm. in diameter; leaflets 5 mm. long; fruit 2.5 cm. wide.

7. **Lysiloma divaricata** (Jacq.) Macbride, Contr. Gray Herb. n. ser. 59: 6. 1919.

Mimosa divaricata Jacq. Pl. Hort. Schoenbr. 3: 76. *pl. 395.* 1798.

Lysiloma schiedeana Benth. Lond. Journ. Bot. 3: 83. 1844.

Baja California and Sonora to Veracruz and Oaxaca. Reported from Nicaragua and Costa Rica.

Shrub or tree, 3 to 18 meters high, the trunk sometimes almost a meter in diameter, the wood very hard; flowers white; fruit 9 to 15 cm. long, 1.5 to 3 cm. wide. "Quiebracha" (Michoacán, Guerrero); "tepeguaje" (Sinaloa).

The wood is used for various purposes and the bark is employed for tanning.

8. **Lysiloma bahamensis** Benth. Lond. Journ. Bot. 3: 82. 1844.

Yucatán. West Indies and southern Florida; type from the Bahamas.

Tree, sometimes 16 meters high, with a trunk 1.2 meters in diameter, the crown broad, the bark smooth, gray or brownish; flowers white; fruits 8 to 15 cm. long, 2.5 cm. wide; wood hard, tough, close-grained, dark reddish brown, its specific gravity about 0.64.

The wood is used in the West Indies for making boats. The species has been reported from Yucatán as *L. latisiliqua* (L.) Benth.

9. **Lysiloma sabicu** Benth. Kew Journ. Bot. 6: 236. 1854.

Reported from Yucatán. Cuba (type locality) and the Bahamas.

Tree 6 meters high; wood hard, heavy, compact, fine-grained, brown, its specific gravity said to be about 0.90. "Xiaxek" (Yucatán, Maya); "sabicú," "jigüe," "jigüe blanco," "moruro de costa" (Cuba).

The wood is of good quality and very durable in water. Formerly it was much used in Cuba for shipbuilding, and was exported to England to be used for the same purpose, as well as for making bobbins and shuttles. It is employed also for cabinetwork.

12. ALBIZZIA Durazz. Mag. Tosc. 34: 11. 1772.

Some of the Old World species yield useful gums and others furnish tanbark.

1. **Albizzia occidentalis** T. S. Brandeg. Proc. Calif. Acad. II. 3: 222. 1892.

Baja California and Sinaloa; Tres Marías Islands; type from San José del Cabo, Baja California.

Tree 5 to 15 meters high, with a trunk sometimes 80 cm. in diameter, the bark smooth, gray; leaves bipinnate, the pinnae about 4 pairs, the leaflets few, obliquely oblong or oval, 2 to 4.5 cm. long, nearly glabrous; flowers yellowish white, capitate; fruit flat, 13 to 20 cm. long, 3 to 4 cm. wide. "Palo escopeta" (Baja California); "palo fierro," "bolillo," "arellano" (Sinaloa).

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This tree is very common in some localities. The wood is used in carpentry.

Albizzia lophantha Benth., a native of Australia, with spicate flowers, narrow leaflets, and small pods, is cultivated in central Mexico.

13. ENTEROLOBIUM Mart. Flora 20[2]: Beibl. 117. 1837.

1. **Enterolobium cyclocarpum** (Jacq.) Griseb. Fl. Brit. W. Ind. 226. 1860.

Mimosa cyclocarpa Jacq. Fragm. Bot. *pl. 34, f. 1.* 1809.

Mimosa parota Sessé & Moc. Pl. Nov. Hisp. 177. 1887.

Sinaloa to Tamaulipas, Veracruz, and Chiapas. Central America, West Indies, and northern South America.

Large unarmed tree, 12 to 30 meters high or larger, with broad spreading crown, the trunk 0.6 to 2.5 meters in diameter; bark rough; leaves bipinnate, the leaflets very numerous, linear-oblong, 10 to 12 mm. long, acute or obtuse; flowers small, white, sessile in dense heads; fruit flat, coiled, 8 to 11 cm. in diameter, dark brown, lustrous; seeds dark brown or black, about 12 mm. long; wood hard, resistant, elastic, grayish tinged with yellow, sometimes livid and mottled. "Orejón" (Veracruz); "huinecaztle," "huanacaxtle" (Sinaloa); "parota" (Michoacán, Jalisco, Guerrero); "piche" (Tabasco); "cuanacaztle," "nacazle" (Oaxaca, from the Nahuatl *cuau-nacaztli*, "ear-tree"); "cascabel sonaja" (Tamaulipas); "guanacaste" (Guatemala, Nicaragua, Honduras, Costa Rica); "nacaxtle" (Veracruz); "conacaste" (Guatemala); "anjera," "carito," "carita" (Colombia); "caro hembra" (El Salvador, Venezuela); "oreja de judío," "árbol de las orejas" (Cuba).

The tree grows rapidly and makes an excellent shade tree because of its broad top. The large trunks are used for canoes, water troughs, etc., and the wood is very durable in water. It is employed in carpentry and cabinetwork. The pods are said to be an excellent feed for cattle, and the seeds as well as the young pods are sometimes cooked to be used for human food. The fruit and bark are rich in tannin. Rose reports that in Sinaloa the bark and fruit are used as a substitute for soap in washing woolen goods and that a syrup made from the bark is used for colds. The fruit is used as a soap substitute in Venezuela also. The gum which exudes from the trunk is employed in Sinaloa as a remedy for bronchitis.

14. PITHECOLLOBIUM Marat. Flora 20[2]: Beibl. 114. 1837.

REFERENCE: Benth. Trans. Linn. Soc. Bot. 30: 570–598. 1875.

Shrubs or trees, spiny or unarmed; leaves bipinnate, the leaflets few or numerous, the petioles usually glanduliferous; peduncles mostly axillary and solitary or fasciculate, or sometimes terminal and racemose, the flowers capitate or spicate; fruit very variable.

Pithecollobium multiflorum Benth. has been reported from Mexico at various times, but apparently it is not found there.

Leaflets large, 0.7 to 2.5 cm. wide or larger, if less than 1 cm. wide the blades rounded and nearly as broad as long; leaflets always few (1 or 2 pairs).
  Plants very spiny.
    Flowers in long spikes.
      Calyx less than one-fourth as long as the corolla. Stamen tube very long-exserted ..... 1. P. macrosiphon.
      Calyx almost or fully half as long as the corolla.
        Stamen tube included or short-exserted; bracts deltoid, minute, about as broad as long; valves of the fruit comparatively thin. 2. P. lanceolatum.

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Stamen tube long-exserted; bracts lanceolate, conspicuous, elongate; valves of the fruit very thick ..... **3. P. calostachys.**

Flowers capitate.

Spines ascending; flowers densely pubescent; leaves pale green. **4. P. dulce.**

Spines divaricate; flowers glabrate; leaves usually bright green. **5. P. unguis-cati.**

Plants unarmed.

Petiole winged ..... **6. P. furcatum.**

Petiole not winged.

Leaflets acute or acuminate; flowers subspicate ..... **7. P. cognatum.**

Leaflets rounded at apex; flowers capitate ..... **8. P. guadalupense.**

Leaflets small, the largest 5 mm. wide, usually much longer than broad; leaflets numerous.

Pinnae one pair.

Valves of the fruit very hard and woody, 2.5 to 3 cm. wide ..... **17. P. confine.**

Valves of the fruit not woody, less than 2 cm. wide.

Leaflets revolute, oblong ..... **9. P. revolutum.**

Leaflets not revolute, oval or suborbicular.

Leaflets pubescent ..... **10. P. elastichophyllum.**

Leaflets glabrous ..... **11. P. compactum.**

Pinnae 2 or more pairs.

Corolla about 1.5 cm. long, densely white-sericeous.

Calyx pilose; leaflets 2 to 2.5 mm. wide ..... **12. P. acatlense.**

Calyx glabrous; leaflets 4 to 7 mm. wide ..... **13. P. leiocalyx.**

Corolla less than 1 cm. long.

Gland present on the rachis at the point of insertion of the lowest pair of pinnae.

Plants unarmed; valves of the pod contorted after dehiscence. Flowers capitate ..... **14. P. arboreum.**

Plants armed with numerous spines; valves not contorted.

Spines recurved; flowers capitate. Leaflets narrowly oblong. **15. P. leptophyllum.**

Spines straight; flowers capitate or spicate.

Flowers spicate ..... **16. P. flexicaule.**

Flowers capitate.

Leaflets 4 or 5 pairs, oval or rounded-obovate, rounded at apex. **17. P. confine.**

Leaflets 10 to 15 pairs, oblong, acute ..... **18. P. schaffneri.**

Gland borne on the petiole below the pinnae.

Calyx glabrous or nearly so; pods constricted between the seeds. **19. P. tortum.**

Calyx densely pubescent; pods not constricted.

Pinnae 4 to 6 pairs in most of the leaves.

Leaflets mostly 5 to 7 mm. wide; plants unarmed. **20. P. tomentosum.**

Leaflets 1.5 to 2.5 mm. wide; plants usually armed with spines.

Pods stipitate, 1.4 to 1.7 cm. wide ..... **21. P. brevifolium.**

Pods sessile or nearly so, 2.5 cm. wide ..... **22. P. albicans.**

Pinnae 2 or 3 pairs in most of the leaves.

Corolla densely sericeous; pinnae and leaflets crowded; spines strongly recurved; pods pubescent ..... **23. P. sonorae.**

Corolla glabrate; pinnae and leaflets not crowded; spines nearly straight; pods glabrous or nearly so ..... **24. P. mexicanum.**

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1. **Pithecollobium macrosiphon** Standl. Contr. U. S. Nat. Herb. **20**: 191. 1919.

Known only from the type locality, between Tumbala and El Salto, Chiapas.

Spiny tree; leaflets 4 to 6 cm. long, obtuse.

2. **Pithecollobium lanceolatum** (Humb. & Bonpl.) Benth. Lond. Journ. Bot. **5**: 105. 1846.

Mimosa ligustrina Jacq. Fragm. Bot. Illustr. 29. *pl. 32, f. 6.* 1809. Not *M. ligustrina* Vahl, 1807.

Inga lanceolata Humb. & Bonpl.; Willd. Sp. Pl. **4**: 1005. 1806.

Pithecollobium ligustrinum Klotzsch; Benth. Trans. Linn. Soc. Bot. **30**: 571. 1875.

Sinaloa to Chiapas, Veracruz, and Tabasco; reported from San Luis Potosí. Central America and northern South America; type from Cumaná, Venezuela.

Tree 3.5 to 5 meters high or larger, armed with short stout spines; pinnae one pair, the leaflets one pair, oblique, 3.5 to 8 cm. long, obtuse, bright green, thick, glabrate; flowers small, white; fruit terete, about 10 cm. long. "Timuche" (Michoacán, Guerrero); "tucuy" (Tabasco, San Luis Potosí); "pichejumo" (San Luis Potosí); "conchi" (Sinaloa); "espino," "chiminango" (Colombia); "bobo" (Venezuela); "abracade" (El Salvador).

3. **Pithecollobium calostachys** Standl. Contr. U. S. Nat. Herb. **20**: 190. 1919.

Tamaulipas and San Luis Potosí to Tabasco and Chiapas; type from Tampico, Tamaulipas.

Tree 4.5 to 6 meters high or larger.

This has been referred commonly to the preceding species but seems specifically distinct by the characters given in the key.

4. **Pithecollobium dulce** (Roxb.) Benth. Lond. Journ. Bot. **3**: 199. 1844.

Mimosa dulcis Roxb. Pl. Coromand. **1**: 67. *pl. 99.* 1795.

Acacia obliquifolia Mart. & Gal. Bull. Acad. Brux. **10**[2]: 317. 1843.

Baja California to Chihuahua, Tamaulipas, and Chiapas; often cultivated. Central America and Colombia; naturalized in the East Indies and elsewhere in the tropics of the Old World; type from Coromandel.

Tree, 4.5 to 20 meters high or larger, very spiny; trunk often 60 to 80 cm. in diameter, the bark grayish; pinnae one pair, the leaflets one pair, 2.5 to 5 cm. long or larger, obtuse, pale green, glabrate; flowers yellowish or greenish white; fruit long and narrow, reddish, pubescent, much coiled and twisted; seeds black, surrounded by a white or reddish aril; wood moderately heavy, flexible, strong, reddish brown. "Huamúchil," "cuamúchil," or "guamúchil" (used widely in Mexico; from the Nahuatl names, which are given variously as *cuaumochtli, quauhmochitl. coacamachalli,* or *quamochitl*); "guamúchitl," "guamuche," "humo" (Tamaulipas); "guaymachile" (Guerrero, *Palmer*); "guamachi" (Guerrero); "pinzan" (Guerrero, Oaxaca, Veracruz); "cuamóchil," "huamúchil costeño," "guamuche," "huamuche," "muchite" (Oaxaca); "yaga-bixihui," "yaga-biguichi" (Oaxaca, Zapotec, *Reko*); "güamuchil" (Durango, *Patoni*); "buamúchil" (*Alcocer*); "espino de playa" (Nicaragua); "mochigüiste" (Costa Rica); "guachimole," "mongollano" (El Salvador); "jaguay" (Guatemala); "inga" (Cuba); "camachile" (Guam, Philippines).

It is of interest to note that the Nahuatl name was introduced, along with the plant itself, into Guam and the Philippines by the Spaniards. The word has been modified there into such forms as "camanchil," "camonsil," "kamachiles," and "camachile." From the Philippines the tree was carried to India, where it is now much planted. The pods are known in India as "Manila tamarinds."

The tree is very resistant to drought. It is nearly evergreen, but loses its old leaves as the new ones appear. The wood is widely employed for general

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construction purposes, for fence posts, and for fuel. The bark yields a yellow dye, and is much used for tanning skins; it is used in domestic medicine, also, because of its astringent properties. The gum exuding from the trunk is transparent and deep reddish brown; dissolved in water it makes good mucilage. The flowers are much frequented by bees and yield a good quality of honey. The fruit is highly esteemed in Mexico and is a common article in the markets. The acidulous aril surrounding the seeds is eaten and is used in the preparation of a beverage similar to lemonade. Stock of all kinds are fond of the pods, and in India monkeys are said to eat them greedily.

The tree is treated by Hernández[1] in a chapter entitled "De *Coaca machalli*, seu Maxilla Colubri." This name ("snake-jaws"), he states, is given because the pair of leaflets somewhat resemble the jaws of a snake. "The leaves," he says, "applied as plasters, allay pain, even those of venereal sores, and relieve convulsions. In flavor they are astringent, sweet, and somewhat glutinous, and in temper to a certain extent cold, or moderately warm." The tree is treated on page 94 of the same work, in a chapter headed "De *Quamochitl*, seu arbore fructus crepitantis." In this account he states that the root bark is good for dysentery; the leaves, with salt, cure indigestion, and also produce abortion; the juice of the seeds, sniffed into the nose, draws off humors from the head; and the pulverized seeds (especially if mixed with rue) cleanse internal ulcers.

5. Pithecollobium unguis-cati (L.) Mart. Hort. Monac. 188. 1829.

Mimosa unguis-cati L. Sp. Pl. 517. 1753.

Chiefly in coastal thickets, Tamaulipas to Yucatán; Sinaloa. West Indies; northern South America; type from Jamaica.

Shrub or small tree, sometimes 9 meters high, with a trunk 30 cm. in diameter, very spiny, the bark reddish brown or gray, shallowly fissured; leaves more or less persistent, the pinnae one pair, the leaflets one pair, obliquely obovate or oval, 2 to 4 cm. long; flowers greenish yellow, sweet-scented, the long stamens purplish; fruit 8 to 12 cm. long, 0.6 to 1.2 cm. wide, twisted, reddish brown; seeds dark brown or blackish, surrounded by a red aril; wood very hard, close-grained, red or purple, with yellow sapwood, its specific gravity about 0.90. "Tzim-ché," "tzin-ché" (Yucatán, Maya, *Seler*); "espino de playa" (Nicaragua); "espinuelo" (Venezuela); "dinde" (Colombia); "manca montero" (Cuba); "uña de gato" (Nicaragua, Cuba, Porto Rico); "rolon" (Porto Rico).

The English names applied to the plant are "cat's-claw," "black-bead," and "bread-and-cheeses."

The bark is astringent, and diuretic and tonic properties are ascribed to it; it has been used for fevers and kidney diseases as well as for treating sores. Barham reports that the plant was much used in Jamaica in domestic medicine, and that it was "a sovereign remedy for the stone and gravel," as well as for affections of the liver and spleen. The Spaniards, he relates, said that the black seeds resembled the kidneys and the white aril the fat surrounding those organs, hence, by the doctrine of signatures, the belief that the plant was a remedy for kidney affections. The fruit is said to be rich in tannin and to yield a yellow dye.

6. Pithecollobium furcatum Benth. Lond. Journ. Bot. 5: 106. 1846.

Known only from the type locality, on the banks of the Río Teapa, Tabasco.

Plants glabrate; pinnae one pair, the leaflets one pair, obliquely obovate-oblong, 7.5 to 10 cm. long, obtuse-acuminate.

7. Pithecollobium cognatum (Schlecht.) Benth. Lond. Journ. Bot. 5: 107. 1846.

Inga cognata Schlecht. Linnaea 12: 560. 1838.

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[1] Thesaurus 90. 1651.

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Veracruz, the type from Colipa. Central America.

Tree, sometime 8 meters high; pinnae 1 pair, the leaflets 1 pair, lanceolate or narrowly oblong, usually 8 to 11 cm. long, thick, lustrous, glabrous. "Soto caballo" (Costa Rica).

8. **Pithecollobium guadalupense** (Pers.) Chapm. Fl. South. U. S. 116. 1860.

Mimosa guadalupensis Pers. Syn. Pl. 2: 262. 1807.

Yucatán. West Indies and Florida Keys; type from Guadeloupe.

Unarmed shrub or tree, sometimes 6 meters high, with a trunk 15 cm. in diameter, the bark dark gray, slightly fissured; leaves persistent, the 4 leaflets obliquely obovate to suborbicular, 4 to 7 cm. long, lustrous; flowers pink; fruit compressed, 10 to 15 cm. long, dark brown, twisted; seeds black, with a red aril.

The writer has seen no material from the Lesser Antilles, and does not feel certain that the name here used really applies to the present plant. The Yucatán specimens, however, are of the same species as the Cuban plant to which the name is now applied.

9. **Pithecollobium revolutum** Rose, Contr. U. S. Nat. Herb. 10: 96. *pl.* 28. 1906.

Known only from the type locality, near Higuerillas, Querétaro.

Low dense shrub; leaflets 6 to 10, about 3 mm. long; fruit flat, curved, 5 to 7 cm. long, pubescent.

10. **Pithecollobium elastichophyllum** A. Gray; S. Wats. Proc. Amer. Acad. 17: 352. 1882.

Coahuila, Nuevo León, and San Luis Potosí; type from Monterrey.

Low spiny shrub with very stiff interlaced branches; leaflets few, 3 to 4 mm. long, coriaceous; flowers reddish, the heads nearly sessile; fruit flat, 1.5 cm. wide, curved, puberulent.

11. **Pithecollobium compactum** Rose, Contr. U. S. Nat. Herb. 8: 33. 1903.

Pithecollobium purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 85. 1919.

Puebla; type from Tehuacán.

Low shrub, usually 30 to 50 cm. high, compact, very spiny; leaflets 5 to 7 pairs, 3 to 4 mm. long, lustrous; flowers greenish, tinged with red, subcapitate; fruit curved, compressed, 1.2 cm. wide, puberulent; seeds brownish black.

12. **Pithecollobium acatlense** Benth. Trans. Linn. Soc. Bot. 30: 593. 1875.

Durango to Puebla and Oaxaca; type from Acatlán, Puebla.

Shrub or small tree, 3 to 4.5 meters high; pinnae 2 or 3 pairs, the leaflets rather numerous, 6 to 10 mm. long, obtuse or acute, pubescent or glabrate; flowers capitate, the heads nearly sessile; fruit flat, straight, about 14 cm. long and 2.5 cm. wide, densely pubescent.

13. **Pithecollobium leiocalyx** Standl. Contr. U. S. Nat. Herb. 20: 189. 1919.

Known only from the type locality, Salina Cruz, Oaxaca.

Leaflets 6 to 14 mm. long, obliquely oval or obovate, pubescent.

14. **Pitchecollobium arboreum** (L.) Urban, Symb. Antill. 2: 259. 1900.

Mimosa arborea L. Sp. Pl. 519. 1753.

Pithecollobium filicifolium Benth. Lond. Journ. Bot. 3: 205. 1844.

Samanea arborea Ricker in Bailey, Stand. Cycl. Hort. 3066. 1917.

Veracruz and Oaxaca. West Indies and Central America; type from Jamaica.

Tree, sometimes 4 meters high, with a trunk a meter in diameter, the bark thick, gray, very rough; leaves large, often 40 cm. long, bright green, glabrate, with numerous pinnae and leaflets, the latter linear, 12 to 15 mm. long; flowers white; fruit subterete, constricted, bright red, puberulent, twisted after dehiscence, blood-red within; seeds black; wood hard, fine-grained, taking

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a good polish. "Coralillo" (Oaxaca); "frijolillo" (Veracruz); "loro," "lorito," "conchido" (Costa Rica); "moruro," "moruro prieto," "tengue" (Cuba); "cojóbana," "cojoba" (Porto Rico); "cola de marano," "cola de mico," "quebracho" (Guatemala, Honduras, *Blake*).

The wood is said to be of excellent quality, and is much used in some parts of the West Indies and Central America for flooring, ceiling, posts, etc.

15. **Pithecollobium leptophyllum** (Cav.) Daveau, Bull. Soc. Bot. France **59**: 635. 1912.

Mimosa leptophylla Cav.; Lag. Gen. & Sp. Nov. 16. 1803.

Pithecollobium palmeri Hemsl. Diag. Pl. Mex. 50. 1880.

Pithecollobium palmeri recurvatum S. Wats. Proc. Amer. Acad. **23**: 272. 1888.

Durango to San Luis Potosí and Puebla; perhaps also in Sonora; type from somewhere in Mexico.

Shrub, 0.6 to 1.5 meters high, very spiny; leaves small, the pinnae few, the leaflets numerous, 3 to 4 mm. long; fruit flat, brown, puberulent, curved, 1 to 1.5 cm. wide.

16. **Pithecollobium flexicaule** (Benth.) Coulter, Bot. Gaz. **15**: 270. 1890.

Acacia flexicaulis Benth. Lond. Journ. Bot. **1**: 505. 1842.

Siderocarpos flexicaulis Small, Bull. N. Y. Bot. Gard. **2**: 91. 1901.

Samanea flexicaulis Macbride, Contr. Gray Herb. n. ser. **59**: 2. 1919.

Tamaulipas and Nuevo León. Southwestern Texas.

Spiny shrub or tree, sometimes 15 meters high, with a trunk 1.2 meters in diameter, the branches irregular and spreading; leaves persistent, the pinnae 2 or 3 pairs, the leaflets 3 to 5 pairs, oblong or obovate, 5 to 12 mm. long, thick, lustrous; flowers yellow, fragrant; fruit somewhat flattened, hard and woody, 10 to 15 cm. long, 2.5 cm. wide, brown or black; wood hard, close-grained, dark red or purplish brown, with yellowish sapwood, its specific gravity about 1.04. "Ebano" (Tamaulipas, Nuevo León).

The wood is very durable and is used for fence posts, wagons, cabinetwork, fuel, etc. The green seeds are cooked and eaten, and when ripe they are often roasted and eaten or used as a substitute for coffee.

17. **Pithecollobium confine** Standl. Contr. U. S. Nat. Herb. **20**: 191. 1919.

Baja California; type from Cape San Lucas.

Shrub or small tree, 1.5 to 3 meters high, similar to the last species but with capitate flowers. "Palo fierro."

18. **Pithecollobium schaffneri** S. Wats. Proc. Amer. Acad. **17**: 352. 1882.

Samanea schaffneri Macbride, Contr. Gray Herb. n. ser. **59**: 2. 1919.

Known only from the mountains about San Luis Potosí.

Shrub, very spiny, pubescent; pinnae 2 to 4 pairs, the leaflets 2 to 3 mm. long, acute; fruit 7.5 to 12.5 cm. long, 1 cm. wide, straight or somewhat curved densely pubescent.

19. **Pithecollobium tortum** Mart. Herb. Fl. Bras. 114. 1837.

Baja California and Sonora to Oaxaca; Veracruz and Yucatán. Central America, West Indies, and South America; type from Brazil.

Slender shrub or tree, 3 to 9 meters high, armed with stout spines, the bark smooth, brown; leaflets oblong or obovate, 7 to 15 mm. long, pubescent or glabrous; fruit 7 to 10 mm. wide, often 20 cm. long or longer, glabrous. "Poralana" (Guerrero); "guayacán" (Honduras).

20. **Pithecollobium tomentosum** Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 285. *pl. 28.* 1903.

Jalisco to Guerrero; Yucatán; type from banks of the Espíritu Santo, altitude 600 meters.

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Tree, 6 to 8 meters high; leaflets 1 to 1.8 cm. long, oblong, puberulent; flowers white. "Parotillo" (Michoacán, Guerrero).

The writer has seen no fruit of this plant, which may belong to some other genus.

21. Pithecollobium brevifolium Benth.; A. Gray, Pl. Wright. 1: 67. 1852.

Havardia brevifolia Small, Bull. N. Y. Bot. Gard. 2: 92. 1901.

Coahuila, San Luis Potosí, and Tamaulipas; type collected between Cerralvo and Monterrey, Nuevo León. Southwestern Texas.

Tree, sometimes 9 meters high, with a trunk 15 cm. in diameter, the bark thin, smooth, gray; leaves persistent, the pinnae 2 to 5 pairs, the leaflets 10 to 20 pairs, 4 to 8 mm. long, pubescent or glabrate; flowers yellowish white; fruit flat, straight, 7 to 12 cm. long, about 1.5 cm. wide; wood hard, close-grained, dark reddish brown, very heavy. "Tenaza" (Nuevo León, Tamaulipas); "huajillo" (Texas); "guajilla" (Tamaulipas).

The tree is of some importance for forage, the leaves being eaten by goats and sheep in winter. The wood is used for various purposes. Specimens collected in Oaxaca probably belong to this species, and others from Sinaloa (where the plant is known as "carbonera") are probably conspecific.

22. Pithecollobium albicans (Kunth) Benth. Trans. Linn. Soc. Bot. 30: 592. 1875.

Acacia albicans Kunth, Mimos. Pl. Légum. 87. *pl.* 27. 1819–24.

Yucatán and Campeche; type from Campeche.

Tree, sometimes 20 meters high; leaflets numerous, 3 to 6 mm. long; fruit about 10 cm. long. "Chucum" (Yucatán); "huisache" (Campeche, *Ramírez*).

The tree is said to produce a gum similar to that of mezquite. The fruit is reported to contain 18 per cent of tannin, and to yield a black dye.

It is probable that the present material is referred here correctly, although it does not quite agree with Bentham's description, especially in regard to the fruit. The type collection was without fruit, and Bentham's description of it was based, presumably, upon specimens from Hidalgo, which may have belonged to some other species.

23. Pithecollobium sonorae S. Wats. Proc. Amer. Acad. 24: 49. 1889.

Dry plains or hillsides, Sonora and Sinaloa; type from Guaymas, Sonora.

Shrub or small tree, 3 to 6 meters high, with very hard wood; leaflets numerous, 3 to 4 mm. long; fruit flat, straight, 7 to 9 cm. long, 1.5 to 2 cm. wide. "Uña de gato" (Sonora); "palo gato" (Sinaloa).

24. Pithecollobium mexicanum Rose, Contr. U. S. Nat. Herb. 1: 100. 1891.

Baja California, Sonora, and Sinaloa; type from Alamos, Sonora.

Tree, 4.5 to 9 meters high or larger, or often only a shrub, with smooth brownish bark, armed with short spines; leaflets few, oblong, about 5 mm. long, pale green; fruit flat, thin. "Chino" or "palo chino."

The wood is used for furniture, etc.

15. INGA Scop. Intr. Hist. Nat. 298. 1777.

References: Bentham, Lond. Journ. Bot. 4: 577–622. 1845; Pittier, Contr. U. S. Nat. Herb. 18: 173–223. *pl. 81–105.* 1916.

Unarmed trees or shrubs; leaves even-pinnate, the leaflets few, large, the petiole often winged; stipules small; flowers large, spicate or capitate; fruit large, the seeds imbedded in a pulp.

The fleshy pulp surrounding the seeds is edible, and the pods are often seen in the markets. The wood is said to be weak and fibrous, with a specific gravity of 0.54 to 0.67, and to be of little value except for charcoal and firewood. Some of the species are often planted to shade coffee bushes and as windbreaks to

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protect cacao plantations. The names "chalahuitl" (San Luis Potosí), "chelele" (Tabasco), "hulándini" (Michoacán), and "coyuacate" (Veracruz) are reported for unidentified species of the genus. Belmar gives the Mixe name as "tahk."

Rachis of the leaf not winged.
  Flowers spicate.
    Spikes long, slender, interrupted; flowers glabrous or nearly so. 1. I. laurina.
    Spikes very short, headlike, dense; flowers densely sericeous. 2. I. leptoloba.
  Flowers capitate.
    Flowers sessile; stipules deciduous 3. I. jinicuil.
    Flowers pedicellate; stipules persistent.
      Corolla 7.5 mm. long or shorter; fruit 9 to 12 cm. long 4. I. paterno.
      Corolla 8 to 9 mm. long; fruit sometimes 40 cm. long 5. I. radians.
Rachis of the leaves winged.
  Corolla 10 to 16 mm. long.
    Leaflets glabrate on the upper surface; corolla scarcely 10 mm. long. 6. I. pringlei.
    Leaflets copiously pubescent on the upper surface; corolla about 15 mm. long.
      Calyx 4 to 6 mm. long 7. I. edulis.
      Calyx about 10 mm. long 8. I. xalapensis.
  Corolla 20 to 25 mm. long.
    Calyx very slender, the tube 2 to 3 mm. thick, thinly pubescent. 9. I. purpusii.
    Calyx broad, the tube 3.5 to 5 mm. thick, densely sericeous.
      Calyx lobes more than half as long as the tube; leaflets 6 pairs. 10. I. fissicalyx.
      Calyx lobes less than half as long as the tube; leaflets usually 5 pairs.
        Calyx 10 to 12 mm. long, covered with loose fulvous hairs; bracts ovate; leaflets obtuse or acutish 11. I. eriocarpa.
        Calyx about 15 mm. long, with a fine, close pubescence; bracts linear or nearly so; leaflets acuminate 12. I. spuria.

1. Inga laurina (Swartz) Willd. Sp. Pl. 4: 1018. 1806.

Mimosa laurina Swartz, Fl. Ind. Occ. 2: 978. 1800.

Jalisco and Guerrero. Central America and the West Indies; type from St. Kitts.

Tree, 7.5 to 15 meters high, with large broad crown; leaflets 4 or 6, elliptic or obovate, 6 to 14 cm. long, acute or acuminate, bright green, glabrous; flowers white, sweet-scented; fruit flat, about 15 cm. long, 3 to 3.5 cm. wide. "Guamá" (Porto Rico).

2. Inga leptoloba Schlecht. Linnaea 12: 560. 1838.

Veracruz, Tabasco, and Oaxaca; type from Hacienda de la Laguna, Veracruz. Central America.

Tree, or often a shrub 2 to 3 meters high; leaflets usually 6, 8 to 18 cm. long, acute or acuminate, glabrous; spikes paniculate. "Vainillo" (Veracruz).

Planted in Costa Rica as shade for coffee.

3. Inga jinicuil Schlecht. Linnaea 12: 559. 1838.

Veracruz; type from Jalapa.

Large or small tree, often planted to shade coffee; leaflets 6, lanceolate to elliptic, glabrous, 8 to 11 cm. long, acute, lustrous; flowers white. "Jinicuil," "cuajinicuil."

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4. **Inga paterno** Harms, Repert. Sp. Nov. Fedde 13: 419. 1914.

Oaxaca. Guatemala (type locality) to Costa Rica.

Medium-sized tree; leaflets 8 or 10, elliptic to lanceolate, 4 to 17 cm. long, obtuse or acute, glabrous; flowers white; fruit flat, 9 to 12 cm. long, 4 to 5 cm. wide, 2 or 3-seeded. "Paterno" (Guatemala); "cuajinicuil" (Costa Rica).

Often planted, like the other species, for coffee shade.

5. **Inga radians** Pittier, Contr. U. S. Nat. Herb. 18: 178. 1916.

Oaxaca and Chiapas; type from Tapachula, Chiapas.

Tree; leaflets usually 6, elliptic or ovate, 7 to 18 cm. long, acuminate, glabrous; fruit sometimes 40 cm. long, 6.5 to 8.5 cm. wide, about 3 cm. thick. "Cuajinicuil" (Chiapas).

6. **Inga pringlei** Harms, Repert. Sp. Nov. Fedde 13: 526. 1915.

Known only from the type locality, Jalapa, Veracruz.

Small tree; leaflets 10 or 12, lance-oblong, 4 to 7.5 cm. long, acuminate, thinly pilose beneath.

7. **Inga edulis** Mart. Flora 20: Beibl. 113. 1837.

Veracruz. Central America and South America; type from Brazil.

Small or large tree, sometimes 15 meters high, with broad spreading crown and gray bark; leaflets usually 6 or 8, very variable in form, mostly 10 to 20 cm. long; fruit short, angled, densely pubescent, with edible pulp. "Guayaniquil" (Costa Rica).

8. **Inga xalapensis** Benth. Lond. Journ. Bot. 4: 616. 1845.

Sinaloa and Jalisco to Veracruz; type from Jalapa, Veracruz. Central America.

Small tree, 6 to 8 meters high, the trunk 50 to 60 cm. in diameter, the bark ashy brown; leaflets 10 to 16, oblong or lance-oblong, 6 to 17 cm. long, acute or obtuse; fruit 10 to 15 cm. long, about 1 cm. wide. "Cuajiniquil" (Jalisco); "vainillo" (Sinaloa); "cuje" (Guatemala).

Wood used in Sinaloa for fence posts.

9. **Inga purpusii** Pittier, Contr. U. S. Nat. Herb. 18: 199. 1916.

Known only from the type locality, Finca Yolanda, Chiapas.

Tree; leaflets 4 or 6, ovate or oblong, 10 to 18 cm. long, acute, pubescent on both surfaces.

10. **Inga fissicalyx** Pittier, Contr. U. S. Nat. Herb. 18: 213. 1916.

Veracruz and Tabasco; type from Zacuapan, Veracruz. Guatemala.

Leaflets lance-oblong, 3 to 11 cm. long, acute, pubescent on both surfaces. "Bitze," "chelele," "guatope" (Tabasco).

11. **Inga eriocarpa** Benth. Lond. Journ. Bot. 4: 615. 1845.

Sinaloa and Jalisco to Michoacán, Oaxaca, and Veracruz; type collected between San Blas and Guadalajara.

Tree, often 12 meters high, with spreading crown and rough black bark; leaflets about 10, oblong to oval-obovate, 4 to 9 cm. long, very thick; flowers white; fruit subterete, tomentose. "Vainillo" (Michoacán, Sinaloa); "aguatope" (Oaxaca, from the Nahuatl *ahua-topochtic*, "white stamens").

12. **Inga spuria** Humb. & Bonpl.; Willd. Sp. Pl. 4: 1011. 1806.

Tepic to Tamaulipas, Veracruz, and Chiapas. Central America and South America; type from Venezuela.

Large or small tree, sometimes 15 meters high, with wide-spreading crown; leaflets about 10, 5 to 13 cm. long, pubescent; flowers white; fruit subterete, short or elongate, tomentose. "Vainillo" (Veracruz); "jinicuile" (Guerrero); "timbre" (Veracruz); "cuje" (Guatemala); "guama" (Venezuela); "cuajinicuil" (Jalisco, Costa Rica).

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DOUBTFUL SPECIES.

INGA CORIACEA Don, Hist. Dichl. Pl. 2: 390. 1832. Described from somewhere in Mexico.

INGA FLEXUOSA Schlecht. Linnaea 12: 559. 1838. *I. schiedeana* Steud. Nom. Bot. ed. 2. 1: 810. 1840. Based upon leaf specimens from Jalapa; perhaps the same as *I. xalapensis* Benth.

66. CAESALPINIACEAE. Senna Family.

Trees or shrubs, often armed with spines: leaves simple, pinnate, or bipinnate; flowers usually large and showy, mostly racemose, regular or irregular; petals usually 5; stamens commonly 10; fruit a legume but very variable in form.

Leaves pinnate, bifoliolate, or simple, never bipinnate.
- Anthers erect. Leaves pinnate ..... 1. CASSIA.
- Anthers versatile.
  - Leaves with numerous leaflets.
    - Calyx lobes 4; fruit thick ..... 2. TAMARINDUS.
    - Calyx lobes 5; fruit very flat and thin ..... 3. POEPPIGIA.
  - Leaves simple or of 2 leaflets.
    - Petals very unequal; fruit winged on the upper suture; leaves simple. 4. CERCIS.
    - Petals subequal; fruit not winged; leaves simple or bifoliolate.
      - Flowers 7 mm. long or shorter. Fruit indehiscent; leaves bifoliolate. 5. CYNOMETRA.
      - Flowers more than 1 cm. long.
        - Calyx lobes 4; fruit indehiscent. Leaves bifoliolate. 6. HYMENAEA.
        - Calyx lobes 5; fruit dehiscent ..... 7. BAUHINIA.

Leaves bipinnate, at least some of them.
- Calyx lobes strongly imbricate; seeds without endosperm.
  - Leaves partly pinnate. Trees or large shrubs ..... 8. HAEMATOXYLUM.
  - Leaves all bipinnate.
    - Plants low shrubs, chiefly herbaceous, unarmed; fruit thin, elastically bivalvate ..... 9. HOFFMANSEGGIA.
    - Plants large shrubs or trees, often spiny; fruit thin and bivalvate or often very thick ..... 10. CAESALPINIA.
- Calyx lobes valvate or slightly imbricate; seeds with endosperm.
  - Plants unarmed.
    - Flowers red; fruit very broad, thick, and hard ..... 11. DELONIX.
    - Flowers yellow; fruit narrow, thin ..... 12. CONZATTIA.
  - Plants armed with spines. Fruit narrow, thin.
    - Fruit linear, constricted between the seeds; rachis of the leaf spinose. 13. PARKINSONIA.
    - Fruit linear-oblong, not constricted; rachis of the leaf not spinose. 14. CERCIDIUM.

1. CASSIA L. Sp. Pl. 376. 1753.

REFERENCE: Bentham, Trans. Linn. Soc. Bot. 21: 503–591. *pl. 60–63.* 1871.

Unarmed trees or shrubs; leaves pinnate, the leaflets large or small; flowers usually yellow, commonly large and showy, racemose, paniculate, or solitary; fruit very variable in form, dehiscent or indehiscent.

Besides the species enumerated here, a large number of herbaceous ones also occur in Mexico.

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Fruit elastically bivalvate. Anthers dehiscent by short terminal slits.
- Flowers mostly in terminal racemes, sometimes also in the upper axils; plants hispid or viscid-pubescent, or both.
  - Petioles equaling or slightly longer than the rachis; leaflets oval to oblong or obovate ..... 1. C. pauciflora.
  - Petioles usually twice as long as the rachis or longer; leaflets rounded-obovate or suborbicular.
    - Fruit hispid with long spreading hairs; plants prostrate or procumbent. 2. C. hispidula.
    - Fruit pilose with short appressed hairs; plants erect ..... 3. C. enneandra.
- Flowers solitary or clustered in the axils; plants neither hispid nor viscid.
  - Leaflets 2 or 4 ..... 4. C. diphylla.
  - Leaflets more than 2.
    - Leaflets 3 or 4 pairs.
      - Venations of the leaflets conspicuously reticulate ..... 5. C. greggii.
      - Venation of the leaflets not reticulate ..... 6. C. macdougaliana.
    - Leaflets numerous pairs.
      - Costa of the leaflet very close to the margin ..... 7. C. cinerea.
      - Costa of the leaflet remote from the margin.
        - Stems glabrate or puberulent ..... 8. C. flexuosa.
        - Stems pilose with spreading hairs ..... 9. C. picachensis.

Fruit indehiscent or dehiscent, never elastically bivalvate.
- Gland of the petiole borne at the base of the petiole.
  - Fruit 15 to 25 cm. long, 2 to 3 mm. wide ..... 10. C. leptocarpa.
  - Fruit 7.5 to 12.5 cm. long, 5 to 8 mm. wide ..... 11. C. occidentalis.
- Glands borne between the leaflets or none.
  - Anthers partly dehiscent by basal pores, pubescent ..... 12. C. grandis.
  - Anthers all dehiscent at or near the apex, usually glabrous.
    - A. Fruit turgid, terete, subterete, tetragonous, or articulate-compressed and strongly constricted between the seeds.
      - Seeds longitudinal.
        - Plants glabrous or nearly so; leaflets usually 3 pairs ..... 13. C. tora.
        - Plants sericeous or stellate-tomentose; leaflets 3 to 5 pairs.
          - Plants sericeous ..... 14. C. ornithopoides.
          - Plants stellate-tomentose ..... 15. C. villosa.
      - Seeds transverse.
        - Leaflets 2 pairs.
          - Racemes axillary, much shorter than the leaves.
            - Leaflets glabrous ..... 16. C. inaequilatera.
            - Leaflets pubescent beneath.
              - Leaflets obtuse ..... 17. C. berlandieri.
              - Leaflets acute ..... 18. C. densiflora.
          - Racemes mostly arranged in a large terminal panicle.
            - Leaflets densely pubescent beneath ..... 19. C. oxyphylla.
            - Leaflets glabrous beneath or obscurely puberulent.
              - Gland present between the lowest pair of leaves; stipules setaceous ..... 20. C. fruticosa.
              - Glands present between both pairs of leaflets; stipules lanceolate ..... 21. C. undulata.
        - Leaflets 3 or more pairs.
          - Leaflets 6 to 18 pairs.
            - Leaflets 6 to 8 pairs, rounded at apex, tomentose beneath. 22. C. tomentosa.
            - Leaflets 8 to 15 pairs, acute, glabrous ..... 23. C. spectabilis.

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Leaflets 3 to 5 pairs.
Leaflets acute, usually glabrous ..... 24. C. laevigata.
Leaflets obtuse or rounded at the apex, often pubescent.
Leaflets densely sericeous ..... 25. C. argentea.
Leaflets glabrous or nearly so ..... 26. C. bicapsularis.

AA. Fruit strongly compressed, flat, not articulate, or if articulate not much constricted between the seeds.

B. Gland present between the lowest pair of leaflets, large and conspicuous.
Fruit breaking into 1-seeded joints ..... 27. C. skinneri.
Fruit not jointed.
Leaflets 2 or 3 pairs.
Fruit linear-oblong, about 12 mm. wide ..... 28. C. purpusi.
Fruit linear, less than 8 mm. wide.
Anthers erostrate ..... 29. C. botteriana.
Anthers partly rostrate.
Interior sepals 12 mm. long; plants usually pubescent. 30. C. leiophylla.
Interior sepals 6 mm. long; plants glabrous. 31. C. holwayana.
Leaflets 4 to 40 pairs.
Leaflets 18 to 40 pairs, linear-oblong ..... 32. C. multijuga.
Leaflets 4 to 15 pairs, usually broader.
Leaflets small, 4 to 6 mm. long ..... 33. C. polyphylla.
Leaflets 7 to 20 mm. long or longer.
Petals about 7 mm. long; flowers in long racemes; leaflets densely pilose beneath ..... 34. C. chiapensis.
Petals 15 to 20 mm. long or larger; flowers clustered or in very short few-flowered racemes; leaflets usually glabrous or sparsely pubescent.
Leaflets acuminate ..... 35. C. tonduzii.
Leaflets rounded or very obtuse at apex.
Leaflets oblong, 9 to 12 pairs ..... 36. C. quiedondilla.
Leaflets obovate to oval, usually 4 to 8 pairs. 37. C. biflora.

BB. Glands none or minute and inconspicuous.
Leaflets 1 pair ..... 38. C. unijuga.
Leaflets 3 to 15 pairs.
Leaflets small, 3 to 7 mm. wide or narrower.
Fruit winged on the margins.
Leaflets 4 to 7 pairs, obovate-oval ..... 39. C. galeottiana.
Leaflets 8 to 14 pairs, elliptic-oblong ..... 40. C. polyantha.
Fruit not winged.
Fruit 9 to 15 cm. long, the valves thin ..... 41. C. wislizeni.
Fruit 14 to 25 cm. long, the valves thick ..... 42. C. pringlei.
Leaflets large, 1 to 6 cm. wide or larger.
Valves of the fruit winged ..... 43. C. alata.
Valves of the fruit not winged.
Leaflets 3 to 5 pairs.
Leaflets acute or acutish, soft-pubescent beneath. 44. C. atomaria.
Leaflets rounded or very obtuse at the apex.
Leaflets oblong ..... 45. C. peralteana.
Leaflets oval, oval-ovate, or rounded.

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Fruit and ovary glabrous or nearly so.
46. C. emarginata.
Fruit and ovary pubescent.....47. C. andrieuxii.
Leaflets 6 to 15 pairs.
Leaflets glabrous; stipules large, reniform.
48. C. nicaraguensis.
Leaflets pubescent; stipules lanceolate to linear.
Fruit glabrous; leaflets usually acute...49. C. racemosa.
Fruit pubescent, at least when young; leaflets very obtuse or rounded at the apex.
Leaflets 1.8 to 3 cm. long; bracts lanceolate.
50. C. liebmanni.
Leaflets mostly 5 to 12 cm. long; bracts rounded-oval.
51. C. reticulata.

1. **Cassia pauciflora** H. B. K. Nov. Gen. & Sp. 6: 360. 1823.

Cassia punctulata Hook. & Arn. Bot. Beechey Voy. 420. 1841.

Sinaloa to Guerrero; type from La Venta del Peregrino. Central America; Brazil.

Shrub 0.6 to 2.5 meters high, viscid-hirsute; leaflets 2 pairs, 1.5 to 4.5 cm. long, obtuse or rounded at apex; petals yellow, nearly 2 cm. long; fruit about 3 cm. long, nearly 1 cm. wide. "Bejuco" (Sinaloa).

2. **Cassia hispidula** Vahl, Eclog. Amer. 3: 10. 1807.

Durango to Veracruz and Chiapas. Central America and South America.

Plants procumbent, usually herbaceous, but sometimes fruticose, very viscid; leaflets 2 pairs, 1 to 2 cm. long; petals bright yellow, 1.5 to 2 cm. long; fruit flat, hirsute, 3 to 4.5 cm. long, 8 mm. wide. "Nahuapate" (Costa Rica).

The plant is used medicinally in Costa Rica. The seeds are reported to contain abrin, the principle found in the seeds of *Abrus precatorius*.

3. **Cassia enneandra** T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 179. 1915.

Oaxaca and Chiapas; type from Cerro de Picacho, Oaxaca. Guatemala.

Slender shrub, 1 to 2 meters high; leaflets 2 pairs, 1 to 1.8 cm. long, thinly pilose; flowers about 1.8 cm. long.

4. **Cassia diphylla** L. Sp. Pl. 376. 1753.

Veracruz to Guerrero and Oaxaca. Widely distributed in tropical America.

Plants essentially annual and usually herbaceous, but often frutescent, prostrate, glabrous; leaflets and large stipules finely parallel-veined.

5. **Cassia greggii** A. Gray, Pl. Wright. 1: 59. 1852.

Chamaecrista greggii Pollard; Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.

Nuevo León (type locality) and Tamaulipas.

Low shrub, nearly glabrous, with gray or brownish branches; leaflets oblong, about 1 cm. long; flowers 1.5 cm. long; fruit flat, 4 cm. long, 6 mm. wide, puberulent.

6. **Cassia macdougaliana** Rose, Contr. U. S. Nat. Herb. 12: 267. 1909.

San Luis Potosí to Puebla; type from Tehuacán, Puebla.

Densely branched shrub, 30 to 60 cm. high; leaflets 4 to 8 mm. long, bright green, thick; flowers large, deep yellow, long-pedicellate.

7. **Cassia cinerea** Cham. & Schlecht. Linnaea 5: 559. 1830.

Chamaecrista cinerea Pollard; Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.

Tamaulipas, Veracruz, and Oaxaca, often on seashores; type collected between Tecolutla and Villa Rica, Veracruz.

Ascending or prostrate shrub, the stem sometimes 2 meters long; leaflets small, pubescent.

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8. Cassia flexuosa L. Sp. Pl. 379. 1753.

Chamaecrista flexuosa Greene, Pittonia 4: 27. 1899.

Chamaecrista amplistipulata Rose, Contr. U. S. Nat. Herb. 12: 267. 1909.

Yucatán to Guerrero and Oaxaca. Central America and northern South America; type from Brazil.

Low erect shrub, with small coriaceous leaflets and large stipules.

9. Cassia picachensis T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 180. 1915.

Guerrero to Oaxaca; type from Cerro de Picacho, Oaxaca.

Very closely related to the preceding species, and probably only a pubescent form of it.

10. Cassia leptocarpa Benth. Linnaea 22: 528. 1849.

Sinaloa to Chihuahua, Veracruz, and Oaxaca. Central America and South America.

More commonly, perhaps, herbaceous, but sometimes shrubby and 2.5 meters high, ill-scented, variable in pubescence, sometimes glabrous but often pilose; leaflets about 5 pairs, ovate, 3 to 10 cm. long, acute or acuminate; flowers large and showy, paniculate; fruit subterete, 15 to 25 cm. long. "Viche" (Sinaloa).

11. Cassia occidentalis L. Sp. Pl. 377. 1753.

Chihuahua to Sinaloa, Chiapas, and Yucatán. Widely distributed in tropical and subtropical America; type from Jamaica.

Herbaceous or shrubby, sometimes 2.5 meters high, ill-scented; leaflets 4 to 7 pairs, ovate, 2 to 8 cm. long, acute or acuminate, usually glabrous; flowers large and showy, mostly axillary; fruit flat, glabrous, with thick margins. "Habilla," "habilla prieta" (Michoacán, Guerrero); "bricho" (Jalisco, San Luis Potosí); "mezquitillo" (Jalisco, Oaxaca); "hediondillo" (Oaxaca); "vainillo" (Oaxaca); "ecapatli" or "ecapacle" (Nahuatl); "frijolillo" (El Salvador, Panama, Nicaragua); "pico de pájaro" (Costa Rica, Nicaragua); "hierba de la potra," "hierba de gallinazo," "aitera," "bicho," "furrusca," "comida de murciélago," "chilinchile" (Colombia); "brusca" (Colombia, Venezuela, Cuba); "hierba hedionda," "martinica" (Cuba).

The seeds are sometimes employed as a substitute for coffee. The plant is used in domestic medicine for its reputed tonic, diuretic, stomachic, and febrifuge properties. It is employed especially for dropsy, rheumatism, fevers, and venereal diseases. An infusion of the leaves has been employed by the regular physicians of the French colonies of western Africa in the treatment of yellow fever, with good results according to reports.[1] The plant is used also, in the form of an ointment, as a remedy for ringworm, eczema, and other cutaneous diseases.

This species is figured by Hernández,[2] and described in a chapter entitled "De *Ecapatli*, seu parva Sambuco." His account is as follows: "*Ecpatli*, which some call *Tlaloaxin*, some *Totoncaxihoitl*, or hot medicine, some *Xomotontli*, or little elder, and others *Xiopatli*, is a hairy shrub, with leaves like the almond, and smooth, purplish, slender, round stems. On the tips of the branches are borne the yellow flowers, from which spring the pods, which are slender, round, and long, filled with purplish seeds, like lentils but smaller, of heavy odor and bitter flavor. The shrub grows in fields of the hot and temperate regions, and is often cultivated about houses and gardens because of its medicinal virtues. Its nature is hot and dry and somewhat astringent. It cures tumors and ulcers and calms ear-ache. The leaves, crushed and applied as a plaster to the belly, benefit infants who vomit their milk; and

[1] See Heckel, Les plantes utiles de Madagascar, p. 266. 1910.

[2] Thesaurus 112. 1651.

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applied likewise to the head they alleviate pain; and applied everywhere to the body, or taken in the quantity of a handful, they relieve fever chills. Some say that in this manner it cures indigestion also, that its application helps that form of leprosy which the Indians call *Xiotl*."

12. Cassia grandis L. f. Suppl. Pl. 230. 1791.

Collected at Acapulco, but perhaps only cultivated; reported from Tabasco. Central America, West Indies, and South America.

Tree, 4 to 10 meters high or larger; leaflets large, oblong, 10 to 20 pairs, pubescent; flowers large and showy, racemose, white or pink; fruit 45 to 60 cm. long, about 3.5 cm. in diameter. "Cañafístulá grande" (Tabasco); "cañafístula" (Guerrero); "carao" (Costa Rica, Nicaragua, El Salvador); "sandal" (Costa Rica); "cargo" (El Salvador, Honduras); "cañafístula gruesa," "cañandonga" (Colombia); "carámano" (Nicaragua); "cañafístula cimarrona" (Porto Rico).

The fruit is filled with a bitter pulp, which has laxative properties and is used in the treatment of fevers.

It is probably this species which has been reported frequently from Mexico as *C. fistula* L. The writer has seen no Mexican specimens of the latter, although it may occur in Mexico, at least in cultivation. The following Mexican names names are reported for *C. fistula:* "Cañafístula," "quauhayohuachtli," "quauhuayo." It has been reported from Oaxaca, Campeche, Morelos, and Veracruz.

13. Cassia tora L. Sp. Pl. 376. 1753.

Baja California and Sonora to Chiapas and Veracruz. Widely distributed in the tropics of both hemispheres.

Plants ill-scented, glabrous or nearly so, usually herbaceous but sometimes fruticose and a meter high; leaflets obovate or rounded-obovate, 2 to 5 cm. long, rounded at apex; flowers large, yellow; fruit 15 to 20 cm. long, 3 to 4 mm. wide. "Dormilón" (Costa Rica); "biche manso" (Sinaloa); "ejotil" (Guatemala, Honduras, *Blake*).

The leaves are said to have the purgative properties of the senna of commerce. In the Old World tropics they are sometimes cooked and eaten. In India the plant bears a great reputation as a remedy for ringworm and other cutaneous diseases. It is sometimes cultivated there for the seeds, which are used as a mordant in dyeing cloth blue. The seeds are sometimes employed in Mexico as a substitute for coffee, and it is said that they have been imported into Europe from the tropics for use in adulterating that article. In India the leaves are fried in castor oil (oil of *Ricinus communis*) and applied to ulcers; they are also crushed and used to relieve the pain of insect stings, and employed as poultices to boils to hasten suppuration. In the same country the seeds, ground and mixed with buttermilk, are employed to relieve itching eruptions of the skin.

14. Cassia ornithopoides Lam. Encycl. 1: 466. 1783.

Cassia sericea Swartz, Fl. Ind. Occ. 724. 1797.

Tamaulipas to Sonora, Guerrero, and Yucatán. Central America, West Indies, and South America.

Plants usually herbaceous, but sometimes fruticose and a meter high, sericeous with rufous or fulvous hairs; flowers small, yellow; fruit short, tetragonous, constricted between the seeds. "Ovilla" (Michoacán, Guerrero); "xtuab" (*Ramirez*).

Seeds used in Brazil as a substitute for coffee, the leaves as poultices for wounds, and the roots as a remedy for dropsy.

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15. Cassia villosa Mill. Gard. Dict. ed. 8. *Cassia* no. 4. 1768.

Cassia astroites Cham. & Schlecht. Linnaea 5: 597. 1830.

Cassia articulata Rose, Contr. U. S. Nat. Herb. 12: 266. 1909.

Baja California; Oaxaca; Yucatán.

Shrub 1 to 2 meters high, easily recognized by the stellate pubescence; leaflets 3 or 4 pairs, ovate, 2.5 to 6.5 cm. long, acute or acuminate; flowers yellow; fruit 4 to 5 mm. wide, densely pubescent, deeply constricted between the seeds.

16. Cassia inaequilatera Balb.; DC. Prodr. 2: 490. 1825.

Reported from Oaxaca by Bentham. Colombia and Venezuela; type from Santa Marta, Colombia.

Leaflets ovate, acuminate; flowers in axillary racemes.

17. Cassia berlandieri Benth. Trans. Linn. Soc. Bot. 27: 520. 1871.

Tamaulipas and Veracruz; type from Tampico.

The writer has seen no material of this species.

18. Cassia densiflora Mart. & Gal. Bull. Acad. Brux. 12: 304. 1843.

Durango to Veracruz, Oaxaca, and Chiapas; type from Guatulco, Oaxaca.

Leaflets obliquely ovate, 6 to 15 cm. long, obtuse or acute, thin, bright green; flowers yellow, in axillary racemes.

19. Cassia oxyphylla Kunth, Mimos. Pl. Légum. 129. *pl. 39.* 1819–24.

Cassia hartwegii Benth. Pl. Hartw. 117. 1843.

Sinaloa to Chiapas. Central America and northwestern South America; type from Venezuela.

Shrub, 2 to 4.5 meters high; leaflets oblique, oblong to obovate-oval, 6 to 18 cm. long, usually short-acuminate; flowers large, pale yellow; fruit subterete, about 14 cm. long and 1 to 1.5 cm. in diameter, the valves thin, smooth. "Candelillo" (Costa Rica); "frijol de monte" (Panama); "casia fístula" (Sinaloa).

The plant is used in Sinaloa as a vomitive.

20. Cassia fruticosa Mill. Gard. Dict. ed. 8. *Cassia* no. 10. 1768.

Cassia bacillaris L. f. Suppl. Pl. 231. 1781

Guerrero to Chiapas, Yucatán, and Veracruz. West Indies, Central America, and northern South America.

Slender, erect or scandent shrub; leaflets ovate, oblong, or obovate, oblique, 7 to 18 cm. long, usually acuminate; flowers yellow, large and showy; fruit terete, 14 to 35 cm. long, 1 cm. or less in diameter. "Quitegato" (Guerrero); "quelite" (Tabasco, *Rovirosa*); "vainillo" (Nicaragua); "sen de palillos" (Costa Rica).

This is probably the species reported by Sessé and Mociño[1] as C. *viminea*.

21. Cassia undulata Benth. in Hook. Journ. Bot. 2: 76. 1840.

Michoacán and Guerrero to Tabasco. Central America and northern South America.

Erect or scandent shrub, 2 to 4 meters high; leaflets obliquely lanceolate or ovate, 4.5 to 9 cm. long, long-acuminate, bright green, lustrous; flowers yellow, large and showy.

22. Cassia tomentosa L. f. Suppl. Pl. 231. 1781.

Querétaro to Hidalgo and Oaxaca; often cultivated. Central America and South America.

Shrub or small tree, 1 to 4.5 meters high, tomentose throughout; leaflets oblong, 2 to 6.5 cm long; flowers large and showy; fruit subterete, tomentose,

[1] Pl. Nov. Hisp. 63. 1887.

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about 11 cm. long, with thin valves. "Retama" (Guerrero, *Ramírez*); "alcaparro" (Colombia).

23. Cassia spectabilis DC. Cat. Hort. Monsp. 90. 1813.

Reported from Veracruz. Central America, West Indies, and Colombia.

Tree, sometimes 9 meters high; leaflets lanceolate, 4.5 to 8 cm. long, attenuate; fruit 25 to 30 cm. long, terete, glabrous, transversely sulcate, with thick hard valves. "Canchín" (Veracruz, *Ramírez*).

It may be that this is one of the species which, in Mexico, have been confused with *C. fistula* L.

24. Cassia laevigata Willd. Enum. Pl. 441. 1809.

Sinaloa to Tamaulipas, Veracruz, and Chiapas. Widely distributed in the tropics of both hemispheres.

Plants herbaceous or fruticose, sometimes 2.5 meters high, or occasionally a small tree, glabrous or nearly so; leaflets usually ovate, 4 to 8 cm. long, acute or acuminate; flowers yellow; fruit subcompressed, 6 to 10 cm. long, 6 to 8 mm. in diameter. "Duerme de noche" (Durango); "retama" or "retamo" (Veracruz, Durango, Oaxaca); "café del país," (Veracruz, Oaxaca); "sen del país," "hierba hedionda macho" (Porto Rico); "frijolillo" (Guatemala, Honduras, *Blake*).

Seeds sometimes used as a substitute for coffee. The plant is said to have purgative properties, and is used in Mexico as an emmenagogue. Sornay states that the plant has been suspected to be poisonous.

This species is figured by Hernández[1] and discussed in a chapter entitled "De *Chatalhuic* Cassia Silvestri." The figure applies to this plant, but the description does not agree in all particulars. He speaks of it as "*chatalhuic*, which some call *Cacaotl* or *Casia fistula*." "The bark," he says, "which is hot and dry in the fourth degree, is light or dark in color; powdered and drunk in the quantity of two drachms in water in the morning it purges the bile and phlegm, and expels worms if there are any in the body. It is esteemed as an excellent drug by the natives. The same bark, mixed with *Axin* and supplied behind the ears, cures earache. The rind of the fruit, which is sweet and in flavor similar to that of *Cassia fistula*, drunk in the same manner and quantity, purges the bile and phlegm, soothes the belly, and acts as a gentle purgative. The same rind, pulverized and infused in water (a comb being wetted with it), restores the hair and makes it grow long. The seeds, ground and mixed with water and drunk, soothe fevers. All of which things have been proved by a thousand experiments." On page 376 of the same work there is figured, without description, "Ecapatli altera," which also is probably of this species.

25. Cassia argentea H. B. K. Nov. Gen. & Sp. 7: 358. 1823.

Known only from the type locality, banks of the Río Mescala.

Said to be a shrub about a meter high, although the related species are much lower and herbaceous. No material seen by the writer.

26. Cassia bicapsularis L. Sp. Pl. 376. 1753.

Cassia ovalifolia Mart. & Gal. Bull. Acad. Brux. 12: 305. 1843.

Cassia manzanilloana Rose, Contr. U. S. Nat. Herb. 1: 325. 1895.

Sonora to Tamaulipas, Yucatán, and Chiapas. Widely distributed in tropical America; also adventive in the Old World.

Shrub, 1.5 to 3 meters high, or often herbaceous, glabrous or pubescent; leaflets oval or obovate, 1.5 to 4 cm. long; flowers pale yellow, very large and showy; fruit subterete, about 11 cm. long and 1 cm. in diameter, smooth. "Bricho" or "bicho" (Jalisco, San Luis Potosí); "alcaparrillo" (Oaxaca,

[1] Thesaurus 70. 1651.

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Guatemala, Peru); "cochimbo" (Oaxaca, Tabasco); "sen del país" (Cuba, Porto Rico); "hoja de sen" (Porto Rico); "hierba del burro" (Argentina).

Leaves reported to have purgative properties. The wood is said to have been used in Brazil for paper making.

27. Cassia skinneri Benth. Trans. Linn. Soc. Bot. **27**: 542. 1871.

Cassia nelsoni Rose, Contr. U. S. Nat. Herb. **5**: 135. *f. 1.* 1897.

Cassia trichoneura T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 179. 1915.

Guerrero to Morelos and Chiapas. Guatemala (type locality).

Shrub or tree, 2 to 6 meters high; leaflets usually 5 pairs, oval, oblong, or obovate, 2 to 4.5 cm. long, rounded at apex, pubescent beneath; flowers yellow, the petals about 3.5 cm. long, conspicuously veined; fruit flat, about 14 cm. long and 1 cm. wide, puberulent. "Parocata" (Guerrero).

28. Cassia purpusi T. S. Brandeg. Zoe **5**: 234. 1906.

Baja California; type from Calmallí.

Low shrub with dark branches; leaflets oval, 1 to 2 cm. long, rounded at apex, glaucescent; flowers yellow; fruit 5 or 6 cm. long, glabrate.

29. Cassia botteriana[1] Benth. Trans. Linn. Soc. Bot. **27**: 541. 1871.

Veracruz and Tepic; type from Orizaba, Veracruz.

No material seen by the writer.

30. Cassia leiophylla Vog. Gen. Cass. Syn. 25. 1837.

Veracruz; reported from Tabasco. Central America and South America; type from Brazil.

Low shrub, or sometimes wholly herbaceous; leaflets broadly obovate, 3 to 5 cm. long, rounded at apex; flowers yellow, the petals 3 cm. long; fruit about 10 cm. long and 5 mm. wide, falcate, glabrate. "Hormiguera" (Tabasco, *Rovirosa*).

31. Cassia holwayana Rose, Contr. U. S. Nat. Herb. **8**: 301. 1905.

Cassia multiflora Mart. & Gal. Bull. Acad. Brux. **10**[2]: 307. 1843. Not *C. multiflora* Vog. 1837.

Puebla, Oaxaca, and Chiapas; type from the city of Oaxaca.

Shrub, 1 to 3.5 meters high, glabrous; leaflets oval or oblong, 2 to 7.5 cm. long, rounded at the apex; flowers yellow, very large and showy; fruit flat, 7 to 11 cm. long, 5 to 7 mm. wide. "Retamo" (Oaxaca, *Villada*).

32. Cassia multijuga L. Rich. Act. Soc. Hist. Nat. Paris 108. 1792.

Puebla and Chiapas. South America; West Indies.

Tree, about 6 meters high; leaflets linear, 10 to 15 mm. long, glabrous; flowers large, yellow; fruit flat, 15 cm. long, 1.5 cm. wide, glabrous.

33. Cassia polyphylla Jacq. Coll. Bot. **4**: 104. 1790.

Yucatán. West Indies; type from Porto Rico.

Shrub, 2 to 4 meters high, or sometimes a tree of 15 meters; leaflets few, oval or obovate; flowers yellow, mostly solitary; fruit flat, linear. "Hediondilla," "retama," "retama prieta" (Porto Rico).

34. Cassia chiapensis Standl. Contr. U. S. Nat. Herb. **19**: 215. 1919.

Chiapas; type from Teopisca.

Probably a shrub, densely pilose throughout; leaflets oval, 2 to 4 cm. long, rounded at apex; flowers small, yellow, racemose; fruit short, flat, thin, glabrate.

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[1]Mateo Botteri, a Dalmatian, was sent to Mexico by the Horticultural Society of London about 1850. Later he collected on his own account, and made very extensive series of specimens, which were widely distributed. These came chiefly, if not entirely, from the region of Orizaba, where he settled and later died.

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35. Cassia tonduzii Standl. Contr. U. S. Nat. Herb. **20**: 215. 1919.

Chiapas. Costa Rica (type locality).

Tree; leaflets elliptic or oblong, 3 to 8 cm. long; flowers yellow, about 3 cm. long; fruit flat, 15 to 18 cm. long, 6 mm. wide, glabrate.

36. Cassia quiedondilla Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 272. *pl. 19.* 1903.

Guerrero; type from Los Fresnos. Guatemala to Costa Rica.

Shrub; leaflets 1.2 to 3 cm. long, rounded at apex, pale beneath, glabrate; flowers yellow, the petals 3 to 3.5 cm. long. "Quiedondilla" (Guerrero).

Probably not essentially different from some of the forms of *C. biflora.*

37. Cassia biflora L. Sp. Pl. 378. 1753.

Cassia acapulcensis H. B. K. Nov. Gen. & Sp. **6**: 353. 1823.

Cassia geminiflora Moc. & Sessé; Collad. Hist. Nat. Méd. Cass. 103. *pl. 3.* 1816.

Baja California to Chihuahua, Yucatán, and Chiapas. Widely distributed in tropical America.

Slender shrub, 0.5 to 2.5 meters high; leaflets 1 to 3.5 cm. long, rounded or sometimes emarginate at apex, glabrous or nearly so; flowers yellow, 2 to 3 cm. long; fruit flat, 5 to 11 cm. long, 4 to 5 mm. wide, straight or curved. "Flor de San José" (Oaxaca); "ahumada," "montenegrito" (Nicaragua); "retama" (Porto Rico); "brucha" (Venezuela); "abejón," "biche silvestre" (Sinaloa).

Said to have been used in the Bahamas as a remedy for venereal diseases.

38. Cassia unijuga Rose, Contr. U. S. Nat. Herb. **5**: 195. 1899.

Puebla; type from Tehuacán.

Densely branched shrub, 30 to 90 cm. high; leaflets rounded, 6 to 11 mm. long, subretuse at apex, pubescent; flowers axillary, yellow. 2.5 cm. long; fruit flat, glabrous, about 10 cm. long and 7 mm. wide.

39. Cassia galeottiana Martens, Bull. Acad. Brux. **10**[2]: 305. 1843.

Puebla and Oaxaca (type locality).

Shrub or small tree, 2 to 4.5 meters high; leaflets 5 to 9 mm. long, rounded at the apex, glabrate; flowers yellow, 1 to 1.5 cm. long; fruit about 7 cm. long and 2 cm. wide, flat and thin, glabrous, narrowly winged, breaking into short joints.

40. Cassia polyantha Moc. & Sessé; Collad. Hist. Nat. Méd. Cass. 112. *pl. 2.* 1816.

Cassia browniana Kunth, Mimos. Pl. Légum. 135. *pl. 41.* 1819–24.

Cassia goldmani Rose. Contr. U. S. Nat. Herb. **10**: 98. 1906.

Baja California; Guanajuato to Oaxaca.

Shrub or small tree, 3 to 4.5 meters high; leaflets 1 to 2 cm. long, rounded at apex, glabrate in age; flowers yellow, about 1 cm. long; fruit similar to that of the preceding species.

41. Cassia wislizeni A. Gray, Pl. Wright. **1**: 60. 1852.

Chihuahua (type locality) to Tamaulipas, San Luis Potosí, and Querétaro. Southern New Mexico and Arizona.

Shrub, 1 to 3 meters high; leaflets obovate or rounded, 4 to 15 mm. long, rounded at apex, thinly and minutely sericeous; petals yellow, 2 cm. long; fruit flat, 6 to 8 mm. wide, glabrous, lustrous. "Pinacate" (Zacatecas).

42. Cassia pringlei Rose. Contr. U. S. Nat. Herb. **5**: 194. 1899.

Cassia morelensis Greenm. Proc. Amer. Acad. **39**: 79. 1903.

Colima to Morelos and Oaxaca; type from Tomellín, Oaxaca.

Shrub or small tree, 1 to 6 meters high; leaflets oblong, obovate, or oval, 5 to 8 mm. long; flowers 2 to 2.5 cm. long; fruit flat, 6 mm. wide.

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43. Cassia alata L. Sp. Pl. 378. 1753.

Guerrero; reported from Yucatán, Oaxaca, and Tabasco, but chiefly cultivated, probably. Widely distributed in tropical America.

Shrub, 1 to 4 meters high; leaflets oval to oblong, 6 to 17 cm. long, rounded at apex, glabrate; flowers large, lemon-yellow, racemose; fruit about 15 cm. long, each valve with a broad thin wing. "Flor del secreto" (Yucatán, Oaxaca); "taratana" (Oaxaca, Tabasco); "soroncontil" (Nicaragua); "bajagua," "lucutema," "mocuteno," "majagüillo" (Colombia); "laureño" (Panama); "guacamaya francesa" (Cuba); "barajo" (Guatemala, Honduras, *Blake*); "talantola," "talantro" (Porto Rico); "guajavo" (Santo Domingo).

In Jamaica the plant is known as "ringworm shrub." It is a very handsome shrub when in flower. In Guam and the Philippines it is called "Acapulco," doubtless from the fact that it was introduced into those islands by the ships which sailed between Acapulco and Manila. In the Philippines this name has also been modified as "Capulco" and "Capurco." Reko refers the Nahuatl name "ecapatli" to this species, and states that the plant was employed by the Aztecs for syphilis. He refers here also the name "totoncaxihuitl" ("fever-herb"), and states that the plant found use also as a remedy for fevers.

The leaves are said to have purgative, diuretic, and sudorific properties, and they are employed widely as a remedy for ringworm and other cutaneous diseases. The decoction of the plant has been used in the West Indies for venereal diseases, as a remedy for snake bites, and to destroy chiggers. Drury reports that it is widely used by Hindoo physicians for all sorts of poisonous bites. For an illustration of the plant see Contr. U. S. Nat. Herb. **8**: *pl. 39*.

44. Cassia atomaria L. Mant. Pl. 68. 1767.

Sinaloa to Chiapas. Central America and South America.

Tree, 5 to 12 meters high; leaflets oblong, elliptic, or ovate, 4.5 to 12 cm. long, densely pubescent beneath; flowers large, yellow, racemose; fruit flat, 14 to 40 cm. long or more, 1 to 1.5 cm. wide. "Quediondillo" (Michoacán, Guerrero; doubtless a corruption of "hediondilla").

45. Cassia peralteana H. B. K. Nov. Gen. & Sp. **6**: 356. 1823.

A very doubtful species; known only from the original collection obtained near Campeche.

Leaflets oblong, 1 to 3 cm. long, appressed-puberulent beneath; flowers in axillary racemes.

46. Cassia emarginata L. Sp. Pl. 376. 1753.

Cassia arborescens Mill. Gard. Dict. ed. 8. *Cassia* no. 15. 1768.

Nearly throughout Mexico. West Indies, Central America, and northern South America.

Tree, 3.5 to 7 meters high, or larger; trunk often 25 to 30 cm. in diameter; bark dark brown; leaflets oblong to rounded-oval, 2 to 13 cm. long, pubescent beneath; flowers large, pale yellow or orange, racemose; fruit like that of *C. atomaria*. "Flor de San José," "alcaparro," "vara de San José," "chile perro" (Oaxaca); "xtuab" (Yucatán); "palo de zorrillo" (Baja California); "palo hediondo" (Veracruz); "mora hedionda" (Sinaloa); "vainillo" (Nicaragua); "brucha macho" (Venezuela); "guacamaya amarilla," "Júpiter amarillo" (Cuba); "palo de chivo" (Santo Domingo).

Reported to have purgative properties and to be used in Jamaica as a dyewood. In Sinaloa the leaves are applied to allay the pain of insect stings. The flowers are very abundant and showy.

47. Cassia andrieuxii Benth. Trans. Linn. Soc. Bot. **27**: 548. 1871.

Cassia fulva T. S. Brandeg. Zoe **5**: 233. 1906.

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Puebla (type locality) and Oaxaca.

Shrub or small tree; leaflets oval or obovate-oval, 1 to 3.5 cm. long, densely pubescent on both surfaces; flowers yellow, racemose; fruit 15 cm. long, about 8 mm. wide.

48. **Cassia nicaraguensis** Benth. Trans. Linn. Soc. Bot. 27: 552. 1871.

Cassia seleriana Harms, Bull. Herb. Boiss. 7: 551. 1899.

Guerrero to Oaxaca. Central America; type from Nicaragua.

Tree, 4 to 6 meters high, glabrous; stipules very large, semireniform, persistent; leaflets numerous, oblong, 3 to 7 cm. long, obtuse or rounded at apex; flowers yellow, in long racemes; fruit 8 to 11 cm. long, nearly 1.5 cm. wide, lustrous, the valves prominently mamillate over the seeds. "Candelita" (Costa Rica); "sambrán" (El Salvador).

49. **Cassia racemosa** Mill. Gard. Dict. ed. 8. *Cassia* no. 19. 1768.

Yucatán. South America.

Tree, 6 to 18 meters high; leaflets oblong to oval-elliptic, 3 to 6 cm. long; flowers large, orange or yellow, in short dense racemes; fruit about 6.5 cm. long and 1 cm. wide, flat.

50. **Cassia liebmanni** Benth. Trans. Linn. Soc. Bot. 27: 549. 1871.

Known only from the type locality, Santiago Estola, Oaxaca.

51. **Cassia reticulata** Willd. Enum. Pl. 443. 1809.

Chiapas; reported from Yucatán and Tabasco. Central America and South America.

Tree, 3.5 to 8 meters high; leaflets oblong to obovate, rounded at apex; flowers large, yellow, in long racemes; fruit very flat, 12 to 18 cm. long, 1.3 to 2 cm. wide, the valves thin. "Sambrán," "sambrán de río" (El Salvador); "saragundín" (Costa Rica); "sorocontil" (Nicaragua); "tarantán" (Venezuela).

2. TAMARINDUS L. Sp. Pl. 34. 1753.

1. **Tamarindus indicus** L. Sp. Pl. 34. 1753.

Widely cultivated in Mexico, as well as elsewhere in tropical America, and often growing without cultivation. Native of the tropics of the Old World.

Large unarmed tree, sometimes 15 meters high or more, with widely spreading crown, the bark brown; leaves pinnate, the leaflets numerous, oblong, 1 to 2 cm. long; flowers large, yellow, striped with red, racemose; fruit large, brown, rough, thick, indehiscent, the 4 to 7 brown seeds surrounded by a juicy red pulp; wood fine-grained, dirty white or yellowish, its specific gravity said to be about 0.94. Known generally as "tamarindo;" the name "huaje" or "hoaxin" is said to be used in some localities.

The tamarind was introduced into Mexico soon after the Conquest, and is now a common tree in many regions. The wood is of some local importance. It is valuable for building purposes and furnishes excellent charcoal for the manufacture of gunpowder. In India the leaves are used to give a yellow dye and the seeds, young leaves, and flowers are eaten. The fruit is the most important product of the tree, the juicy, acidulous pulp being eaten and employed generally in tropical America in the preparation of cooling beverages. It is made also into various kinds of sweetmeats. In some parts of tropical America a fermented drink is made from the pulp.

In India the fruit is much used for flavoring curries, and the seeds are often cooked and eaten. The young seedlings also are boiled as a vegetable, likewise the leaves and flowers.

The pulp of the fruit is official in the U. S. Pharmacopoeia. It contains sugar and acetic, tartaric, and citric acids. Its fluid extract is laxative and

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refrigerant, and an infusion is employed as a beverage in febrile diseases. The supply of the fruit for the United States comes chiefly from the West Indies; that for Europe from India, the West Indies, and Ecuador. For shipment the outer shell is stripped off and the pulp preserved with sugar or syrup. In Madagascar a decoction of the bark is employed for asthma and amenorrhoea, and a decoction of the leaves for intestinal worms and derangements of the stomach.

The tamarind is described at length by Hernández.[1] For an illustration of the leaves and fruit see Contr. U. S. Nat. Herb. 9: *pl. 66*.

Ceratonia siliqua L., the carob or St. John's-bread ("algarrobo"[2]), a native of the Old World, is cultivated at Guaymas, Sonora, and probably elsewhere. It has pinnate leaves with large oval leaflets, and large brown pods containing a thick edible pulp.

3. POEPPIGIA Presl, Symb. Bot. 1: 15. 1830.

1. **Poeppigia procera** Presl, Symb. Bot. 1: 16. *pl. 8*. 1830.

Guerrero and Oaxaca. Cuba, Central America, and South America.

Nearly glabrous tree, 4 to 5 meters high, unarmed; leaves pinnate, the leaflets numerous, linear-oblong, 1 to 2 cm. long, glabrate; flowers yellow, showy, paniculate; fruit flat and thin, narrowly winged on the upper suture, 4 to 9 cm. long, 1 to 1.5 cm. wide; wood hard, the sapwood white, the heartwood reddish, beautifully veined. "Quiebra-hacha," "bicho" (Oaxaca); "tengue," "abey hembra" (Cuba).

4. CERCIS L. Sp. Pl. 374. 1753.

1. **Cercis canadensis** L. Sp. Pl. 374. 1753.

Coahuila to San Luis Potosí. Eastern United States.

Large shrub or small tree, 3 to 12 meters high, the trunk sometimes 30 cm. thick; bark smooth, light brown; leaves deciduous, reniform or ovate-orbicular, 5 to 9 cm. wide, glabrous or pubescent beneath; flowers pink or purplish, clustered, appearing before the leaves; fruit flat, thin, 6 to 10 cm. long, 1 to 1.5 cm. wide, bronze, somewhat glaucous; wood hard, close-grained, yellowish brown, its specific gravity about 0.70. "Pata de vaca" (San Luis Potosí).

Palmer reports that in San Luis Potosí the flowers are fried and eaten, being considered a great delicacy. The bark has mild but very active astringent properties, and has been recommended for the treatment of chronic diarrhoea and dysentery.

C. reniformis Engelm. (*C. texensis* Sarg.) has been reported from Mexico. That species does not appear to be very clearly distinct from *C. canadensis*. The Mexican material at hand seems to represent a single species, and agrees better with *C. canadensis* than with the material that has been referred to *C. reniformis*.

5. CYNOMETRA L. Sp. Pl. 382. 1753.

1. **Cynometra oaxacana** T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 180. 1915.

Guerrero and Oaxaca; type from Cerro de Picacho, Oaxaca.

Unarmed tree, 8 to 10 meters high; leaves nearly sessile, bifoliolate, the leaflets very oblique, 3 to 6.5 cm. long, obtuse, thick, lustrous, glabrous; flowers

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[1] Thesaurus 83–84, with figure. 1651. For other accounts see Popenoe in Bailey, Stand. Cycl. Hort. 3306–3307. *f. 3768*. 1917; Safford, Contr. U. S. Nat. Herb. 9: 383. 1905; Cook, Contr. U. S. Nat. Herb. 8: 248. 1903.

[2] This is the tree to which the name "algarrobo" is applied in Spain. The Spaniards who came to Mexico in early days applied the name to various similar, more or less closely related plants.

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small, white, in short racemes, long-pedicellate; fruit ellipsoid, compressed, 2.5 to 3 cm. long.

6. HYMENAEA L. Sp. Pl. 1192. 1753.

Some of the species occurring along the East African coast furnish valuable gums which are exported as "copal gum" for the manufacture of varnish. The gum is exuded chiefly about the roots, and in some localities deposits of "fossil" gum are found, where the trees themselves have disappeared. From 800,000 to 1,200,000 pounds of the gum are said to be exported annually from Zanzibar.

1. **Hymenaea courbaril** L. Sp. Pl. 1192. 1753.

Hymenaea candolleana H. B. K. Nov. Gen. & Sp. 6: 323. *pl. 566.* 1823.

Tepic to Chiapas, Veracruz, and Tabasco. Widely distributed in Central America, the West Indies, and South America.

Unarmed tree, 5 to 25 meters high, or even larger, the trunk sometimes 2 meters in diameter, sometimes furnished with buttresses, the bark thin, whitish; leaves bifoliolate, persistent, the leaflets obliquely ovate, oblong, or oval, 5 to 10 cm. long, obtuse to acuminate, thick and leathery, gland-dotted; flowers large, whitish or purplish, corymbose-paniculate; fruit large, brown, rough, usually 2-seeded, indehiscent, the valves very thick and hard. "Cuapinol," "cuapinole," "cuapinoli," "coapinol," "guapinol," "guapinole" (Tabasco, Oaxaca, Veracruz, Jalisco, Central America, etc.; from the Nahuatl *cua-pinolli*, sometimes written *quauhpinoli*); "nere" (Oaxaca, Zapotec, *Reko*); "copinol" (Guatemala, El Salvador); "algarrobo" (El Salvador, Cuba, Porto Rico, Panama, Venezuela); "quiebra-hacha," "curbaril" (Cuba); "palito colorado" (Guatemala, Honduras, *Blake*).

The name "courbaril" is said to be employed in British Guiana and "jatoba" in Brazil. The wood is very hard, tough, and heavy (the specific gravity reported as 0.90 and 1.06), and is colored somewhat like mahogany; it is employed for general construction, ship building, furniture, sugar mills, etc., and is sometimes exported. The Indians of Brazil use both the trunks and the bark for making canoes. The seeds are surrounded by a sweet pulp, which becomes mealy when the fruit is ripe. This pulp is edible; it is mixed with water to prepare a kind of "atole," which is said to be very nutritious, and is sometimes fermented to produce an alcoholic beverage. A pale yellow or reddish gum ("resina de cuapinole," "goma animé de México," "ámbar del país," "ámbar de cuapinole," "succino del país," "succino criollo," "goma de la tierra," "incienso de la tierra," "incienso de Petapa") exudes from the trunk, and is found more abundantly on the roots. In Mexico this has been much used for incense in churches, and is employed in making varnish for furniture, patent leather, etc. It is sometimes collected in Mexico for export, and this tree is supposed to be the source of the "gum animé," of which large quantities are shipped from Brazil. This was formerly used in official medicine, especially in the preparation of ointments and plasters, but now it is employed only in the manufacture of varnish and incense. The fruit contains large resin pockets whose contents harden into gum. In the regions where the tree is native the gum is sometimes smoked to relieve asthma and is employed locally for rheumatism, catarrh, ulcers, and venereal diseases. The decoction of the bark is reputed to act as an arterial sedative and to have purgative vermifuge and carminative properties.[1] For an illustration of the fruit see Contr. U. S. Nat. Herb. 8: *pl. 41.*

7. BAUHINIA L. Sp. Pl. 374. 1753.

Trees or shrubs, often armed with spines, sometimes scandent, the stems often compressed; leaves simple and palmately nerved, entire or bilobate,

[1] See Noriega, Bol. Dir. Estud. Biol. (Mexico) 2: 357–363. *f. 1–3.* 1918.

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or sometimes bifoliolate; flowers racemose, usually large and showy, the racemes often paniculate; fruit flat, indehiscent or bivalvate.

There are many species of the genus in the East Indies, some of which are cultivated in tropical America because of their very showy flowers. Some of the Old World representatives yield a gum which, however, is of little importance, and the bark of certain species is used for tanning. Others have bark which furnishes dyes or from which rope is made, some are said to be employed as fish poisons, and some have edible flowers and seeds. Vermifuge properties are ascribed to certain species, and others are employed as remedies for liver affections.

The following names are reported for Mexican species whose identification is uncertain: "Timbe" (Jalisco); "hierba de la vaca" (Durango); "papalocuahuite" (San Luis Potosí).

Stamens 10, all or 5 of them perfect.
- Plants armed with spines.
  - Lobes of the leaves acute ..... 1. B. leptopetala.
  - Lobes rounded ..... 2. B. longiflora.
- Plants unarmed.
  - Leaves bifoliolate ..... 3. B. heterophylla.
  - Leaves simple.
    - Fruit elliptic-oblong ..... 4. B. glabra.
    - Fruit linear.
      - Leaves 3.5 cm. long or shorter, the lobes broadly rounded. 5. B. andrieuxii.
      - Leaves 4 to 11 cm. long, the lobes acute or acutish ..... 6. B. ungulata.

Stamens, except one or two, sterile and reduced to staminodia.
- Leaves all or mostly bifoliolate.
  - Leaflets 2-nerved; flowers solitary ..... 7. B. ramosissima.
  - Leaflets 3-nerved; flowers racemose.
    - Leaflets less than 2.5 cm. long ..... 8. B. unguicularis.
    - Leaflets 2.5 to 5 cm. long ..... 9. B. uniflora.
- Leaves simple.
  - Petals 2, much shorter than the calyx lobes ..... 10. B. dipetala.
  - Petals 5, equaling or much longer than the calyx lobes.
    - Leaves not bilobate ..... 11. B. jenningsii.
    - Leaves all or mostly bilobate.
      - Leaves lobed more than halfway to the base.
        - Leaves coriaceous, reticulate-veined, deeply cordate at base. 14. B. pes-caprae.
        - Leaves membranaceous, not reticulate-veined, shallowly or not at all cordate at base.
          - Pedicels less than 5 mm. long, stout; pubescence of the petals appressed ..... 15. B. lunarioides.
          - Pedicels 7 to 12 mm. long, slender; claws of the petals pilose with spreading white hairs.
            - Leaves broader than long, about 8 cm. long ..... 16. B. lunaria.
            - Leaves as long as broad or longer, 7 to 15.5 cm. long. 17. B. pringlei.
      - Leaves lobed less than halfway to the base, or barely to the middle.
        - Petals nearly sessile, the claw very short ..... 18. B. coulteri.
        - Petals borne on long slender claws.
          - Petals densely pilose or tomentose, at least on the claw and lower part of blade.

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Blades of the petals 2.5 mm. wide or narrower.
19. B. subrotundifolia.
Blades of the petals nearly 1 cm. wide.
Leaves 9-nerved, lobed halfway to the base, 5 cm. wide or narrower ----------12. B. macranthera.
Leaves 7-nerved, lobed less than halfway to the middle, 6 to 8 cm. wide----------13. B. retifolia.
Petals glabrous or nearly so.
Leaves glabrous.
Leaves 5 to 10 cm. long, all deeply bilobate.
20. B. unilateralis.
Leaves 10 to 22 cm. long, shallowly bilobate, or some of them often entire----------21. B. pansamalana.
Leaves pubescent.
Leaves green beneath, almost concolorous, with numerous small glands, the lobes usually acute or acuminate.
22. B. mexicana.
Leaves pale beneath, nearly or wholly without glands.
Pubescence of the lower surface of the leaves, between the veins, of closely appressed hairs.
Leaves large, usually 5 to 8 cm. long, deeply lobed, the lobes divaricate, usually pointed--23. B. divaracata.
Leaves small, 1.5 to 5.5 cm. long, shallow lobed, the lobes not divaricate, rounded----------24. B. spathacea.
Pubescence of the lower surface of the leaves of soft spreading hairs.
Petals purplish----------25. B. schlechtendaliana.
Petals white----------26. B. latifolia.

1. **Bauhinia leptopetala** DC. Prodr. 2: 513. 1825.

Described from Mexico. Known to the writer only from Mociño and Sessé's plate.[1]

Leaves cordate at base, glabrous; flowers greenish, the petals linear, acute.

2. **Bauhinia longiflora** Rose, Contr. U. S. Nat. Herb. 10: 97. 1906.

Bauhinia chlorantha T. S. Brandeg. Zoe 5: 200. 1905.

Sinaloa to Guerrero; type from Imala, Sinaloa.

Spreading shrub or tree, 3 to 9 meters high, armed with short stout spines; leaves 2.5 to 6 cm. wide, green, sparsely pubescent beneath; flowers large, greenish; fruit 15 to 20 cm. long, 1 to 1.5 cm. wide, borne on a very long slender stipe.

Perhaps not different from *B. pauletia* Pers. (*Pauletia aculeata* Cav.), a species described from Panama.

3. **Bauhinia heterophylla** Kunth, Mimos. Pl. Légum. 46. 1919–24.

Yucatán. West Indies and northern South America; type from Venezuela.

Scandent shrub, 3 to 4.5 meters high.

4. **Bauhinia glabra** Jacq. Stirp. Amer. 119. *pl. 173, f. 3.* 1763.

Yucatán; Colima; reported from Veracruz. Central America and northern South America; type from Cartagena, Colombia.

Scandent shrub; leaves 5 to 7.5 cm. long, long-petiolate, the lobes obtuse, thinly brown-sericeous beneath; fruit 5 to 7 cm. long, nearly 2 cm. wide, 1 or 2-seeded, very thin, brown-sericeous.

The Mexican plant may be specifically distinct.

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[1] DC. Calq. Dess. Fl. Mex. *pl. 223.*

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5. Bauhinia andrieuxii Hemsl. Diag. Pl. Mex. 48. 1880.

Oaxaca; type from the city of Oaxaca.

Shrub with reddish brown branches; leaves mostly 2 to 3 cm. wide, pubescent beneath; flowers few.

6. Bauhinia ungulata L. Sp. Pl. 374. 1753.

Pauletia inermis Cav. Icon. Pl. 5: 6. *pl. 409.* 1799.

Bauhinia inermis Pers. Syn. Pl. 1: 455. 1805.

Bauhinia cavanillei Millsp. Field Mus. Bot. 1: 364. 1898.

Tepic to Veracruz, Tabasco, and Chiapas. Central America.

Erect shrub or small tree, unarmed, the branches slender, reddish brown; leaves 3 to 10 cm. wide, brown-pubescent and gland-dotted beneath; flowers 4 to 5 cm. long, white or greenish; stamens white; fruit 15 to 20 cm. long, about 1 cm. wide, minutely puberulent or glabrate. "Pato de venado" (Oaxaca. Michoacán, Guerrero); "calzoncillo" (Tabasco); "casco de venado" (Costa Rica); "cocla" (Panama).

Leaves said to have sudorific properties.

7. Bauhinia ramosissima Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 339. 1880.

Coahuila to Hidalgo; type from Zimapán, Hidalgo.

Densely branched shrub; leaflets about 1.5 cm. long, rounded at apex, bright green, glabrous; flowers 2.5 cm. long; fruit 1 to 1.5 cm. wide, short-stipitate.

8. Bauhinia unguicularis Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 340. 1880.

Known only from the type locality, Zimapán, Hidalgo.

Densely branched shrub; leaflets rounded at apex, glabrate; petals 3 cm. long.

9. Bauhinia uniflora S. Wats. Proc. Amer. Acad. 21: 451. 1886.

Coahuila and San Luis Potosí; type from Jimulco, Coahuila.

Large, densely branched shrub; leaflets oval or rounded, glabrate, thick; flowers purplish, about 3 cm. long.

10. Bauhinia dipetala Hemsl. Diag. Pl. Mex. 48. 1880.

Veracruz, Puebla, and Oaxaca; type from Valley of Córdoba, Veracruz.

Shrub or small tree, 3 to 4.5 meters high; leaves 3.5 to 12 cm. long, puberulent or glabrate beneath, the lobes rounded or obtuse; flowers purplish, the stamens long-exserted; fruit about 15 cm. long and 1 to 1.5 cm. wide, long-stipitate.

11. Bauhinia jenningsii P. Wilson, Bull. Torrey Club 43: 463. 1916.

Yucatán. Isle of Pines, Cuba (type locality).

Leaves ovate-oblong or ovate, sometimes subhastate, 4.5 to 10 cm. long, acute or obtuse at apex, subcordate at base, pale beneath; flowers about 1.5 cm. long; fruit 8 cm. long and 1.2 cm. wide.

12. Bauhinia macranthera Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 338. 1880.

Known only from the type locality, Zimapán, Hidalgo.

Leaves pubescent beneath, the lobes rounded; flowers subsolitary, the petals 3 cm. long; fruit about 12 cm. long, glabrous.

13. Bauhinia retifolia Standl., sp. nov.

Type from Rascón, San Luis Potosí (*Purpus* 5268; U. S. Nat. Herb. no. 463835).

Young branches stout, ferruginous-tomentulose, unarmed; petioles 1.5 to 2.5 cm. long, sparsely tomentose at first but soon glabrate; leaf blades 5.5 to 9.5 cm. long, 6 to 8 cm. wide, openly cordate or subcordate at base, 7 or 9-nerved, bilobate at the apex for about one-third the total length, the lobes deltoid, obtuse or rounded at apex, coriaceous, bright green, concolorous, the venation very

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prominent and closely reticulate on both surfaces, lustrous above, glabrous, obscurely puberulent beneath along the nerves but elsewhere glabrous; flowers racemose, the racemes axillary, short, dense, the pedicels short, stout, tomentulose; calyx spathaceous, 2 to 2.4 cm. long, thinly puberulent; the teeth short, subulate; petals 5, 3 to 4 cm. long, the blade oval, about 1.5 cm. long, thinly racemose, the racemes axillary, short, dense, the pedicels short, stout, thinly tomentose near the base but elsewhere glabrous, the claw slender, densely tomentose; ovary long-stipitate, densely tomentose.

Related to *B. macranthera* Benth. The writer has seen no material of that species, but according to the description it differs in having small, 9-nerved, deeply bilobate leaves, and much shorter petioles.

14. Bauhinia pes-caprae Cav. Icon. Pl. 5: 3. *pl. 404.* 1799.

Guerrero; type from Acapulco.

Small tree, 3.5 meters high or larger; leaves 3 to 8 cm. long, glabrous or nearly so, very thick, the lobes rounded at apex; flowers about 3 cm. long, the petals white-sericeous outside, pink within. "Pié de cabra."

15. Bauhinia lunarioides A. Gray; S. Wats. Bibl. Ind. N. Amer. Bot. 205. 1878.

Nuevo León and probably elsewhere.

Leaves 3.5 to 5.5 cm. long, more or less pubescent beneath, the lobes rounded at apex; flowers about 3 cm. long.

16. Bauhinia lunaria Cav. Icon. Pl. 5: 4. *pl. 407.* 1799.

Known only from the type locality, Acapulco, Guerrero.

Shrub, 1.8 to 2.5 meters high; petals purplish.

17. Bauhinia pringlei S. Wats. Proc. Amer. Acad. 25: 147. 1890.

Jalisco to Guerrero; type from Guadalajara.

Slender shrub, 4.5 to 6 meters high; leaves 7.5 to 18 cm. wide, thin, bright green above, pale and glabrate beneath, the lobes rounded to acute; petals 3 cm. long, white, with a purple stripe along the costa; fruit about 12 cm. long and 1.3 cm. wide.

18. Bauhinia coulteri Macbride, Contr. Gray Herb. n. ser. 59: 22. 1919.

Bauhinia platypetala Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 339. 1880. Not *B. platypetala* Burch. 1878.

San Luis Potosí and Hidalgo; type from Zimapán, Hidalgo.

Shrub, 30 to 60 cm. high, or perhaps larger; leaves 2 to 5 cm. wide, very shallowly lobed, the lobes broadly rounded; flowers about 2.5 cm. long; fruit 12 cm. long or shorter, 1.5 cm. wide.

19. Bauhinia subrotundifolia Cav. Icon. Pl. 5: 4. *pl. 406.* 1799.

Colima and Guerrero; type from Acapulco, Guerrero.

Shrub or tree, 2.5 to 6 meters high; leaves 3 to 5 cm. wide, puberulent or glabrate beneath, the lobes broadly rounded; flowers 1.5 cm. long, white; fruit 1.5 cm. wide, short, puberulent.

20. Bauhinia unilateralis Britten, Journ. Bot. Brit. & For. 35: 233. 1897.

Veracruz.

Leaves mostly 7-nerved, pale beneath; fruit about 15 cm. long, 1.5 cm. wide. "Pata de cabra."

21. Bauhinia pansamalana Donn. Smith, Bot. Gaz. 13: 27. 1888.

Chiapas. Guatemala; type from Pansamalá.

Shrub or small tree, 3 to 4 meters high; leaves 6 to 15 cm. wide, thin, bright green, glabrous, 7-nerved, some of them often entire but most of them with 2 short attenuate lobes; flowers purplish; fruit often 30 cm. long, 2 to 2.5 cm. wide.

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22. Bauhinia mexicana Vog. Linnaea 13: 299. 1839.

Bauhinia confusa Rose, Contr. U. S. Nat. Herb. 10: 97. 1906.

Tamaulipas to Veracruz and Puebla; type from Papantla, Veracruz.

Shrub or small tree, 2 to 4.5 meters high, the trunk sometimes 12 cm. in diameter, the bark gray, rough; leaves 3 to 6.5 cm. wide, puberulent or glabrate beneath; flowers 2 to 2.5 cm. long, white, often tinged with pink; fruit 1.2 to 1.5 cm. wide, straight or falcate. "Pata-vaca," "pata de vaca" (Tamaulipas).

Plant used in Tamaulipas as a remedy for jaundice.

23. Bauhinia divaricata L. Sp. Pl. 374. 1753.

San Luis Potosí to Tabasco and Yucatán. Central America and West Indies.

Shrub or tree, 1.8 to 9 meters high; leaves 3 to 9 cm. wide, subcordate at base, the lobes usually divaricate, obtuse or acutish; flowers white, about 2 cm. long; fruit 1 to 1.5 cm. wide. "Pata de vaca" (Yucatán, San Luis Potosí); "tzu luth" (Yucatán, Maya, *Seler*); "pata de res" (San Luis Potosí); "huamúchil" (San Luis Potosí, *Seler*); "pato de chivo" (Santo Domingo).

Wood used by the Indians for making bows. The species has been reported from Mexico as *B. porrecta* Swartz.

24. Bauhinia spathacea DC. Prodr. 2: 512. 1825.

Oaxaca to Yucatán.

Shrub or small tree; leaves 2 to 5.5 cm. wide; flowers white. "Pata de vaca" (Yucatán).

The material referred here by the writer may not be correctly identified, and it is doubtful if it is specifically distinct from the preceding species. The plant has been reported from Yucatán as *B. porrecta* Swartz.

25. Bauhinia schlechtendaliana Mart. & Gal. Bull. Acad. Brux. 10 [2]: 308. 1843.

Bauhinia goldmani Rose, Contr. U. S. Nat. Herb. 10: 97. 1906.

Oaxaca and Chiapas; type from Río de las Vueltas, Oaxaca.

Tree, 6 to 8 meters high; leaves 4 to 5 cm. wide, the lobes obtuse or acute; flowers 2.5 cm. long; fruit about 12 cm. long and 1.2 cm. wide.

Doubtfully distinct from the next species.

26. Bauhinia latifolia Cav. Icon. Pl. 5: 4. *pl. 405.* 1799.

Bauhinia amblyophylla Harms, Bull. Herb. Boiss. 7: 548. 1899.

Sinaloa to Oaxaca and Veracruz; type from Acapulco, Guerrero. Guatemala.

Shrub or tree, 2 to 6 meters high, the bark brownish gray, shallowly fissured; leaves 3.5 to 11 cm. wide, pubescent beneath, the lobes acute to rounded; fruit 1 to 1.5 cm. wide; wood nearly white. "Pata de venado" (Michoacán, Guerrero); "pié de venado" (Oaxaca); "pata de cabra," "pié de cabra," "guacimilla cimarróna" (Sinaloa).

8. HAEMATOXYLUM L. Sp. Pl. 384. 1753.

Trees or shrubs, glabrous or nearly so, armed with stout spines; leaves pinnate, the leaflets few, of medium size; flowers yellow, racemose, the racemes axillary; fruit flat, thin, dehiscent along the sides.

Petals 5 to 6 mm. long ..... 1. H. campechianum.
Petals 7 to 9 mm. long ..... 2. H. brasiletto.

1. Haematoxylum campechianum L. Sp. Pl. 384. 1753.

Tabasco, Campeche (type locality), and Yucatán. West Indies.

Tree, sometimes 15 meters high. the trunk and branches gnarled, flattened and irregularly fissured, covered with grayish or brownish, rough bark; leaflets broad, somewhat wedge-shaped, 1 to 3 cm. long, with numerous fine parallel veins, emarginate at apex; flowers ill-scented; wood hard, with characteristic odor, the sapwood yellowish, the heartwood reddish brown, becoming deep red on exposure, the specific gravity about 1.003. Known in Mexico as "palo de tinta," "tinto," "palo de Campeche."

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The wood (logwood) is a well-known article of export and has been exported from Mexico, Central America, and the West Indies in vast quantities. Formerly its export was the chief industry of Yucatán and Tabasco, and it is still shipped in considerable amounts. It is stated that when Grandmont captured Campeche he burned more than a million logs stored there. The wood is used principally for dyeing, its properties being dependent upon the peculiar principle, haematoxylin or hematin, which it contains. Logwood is one of the few natural dyewoods which has not been replaced satisfactorily by synthetic dyes. Its properties were made known at an early date, and the wood was soon an important article of export to Spain from Mexico and the West Indies. Acosta relates that in 1587 130 quintals of it were shipped to Spain from Santo Domingo. The tree seems to be native in Hispaniola, but it was naturalized at an early date in Jamaica and the Bahamas, where it did not grow naturally.

The heartwood is official in the U. S. Pharmacopoeia, being used in medicine as a mild astringent, especially in diarrhoea and dysentery. The wood contains about 10 per cent of tannin. The seeds are sometimes employed to flavor food.

2. Haematoxylum brasiletto Karst. Fl. Columb. 2: 27. *pl. 114.* 1862–69.

Haematoxylum boreale S. Wats. Proc. Amer. Acad. 21: 426. 1886.

Chihuahua to Baja California, Oaxaca, and Morelos. Guatemala to Colombia (type locality); Haiti.

Tree, similar in habit to the last species, rarely more than 7 meters high, often only a shrub; bark dark brown; leaves persistent until the appearance of the new ones, the young leaflets usually tinged with bronze; leaflets oblong-oval to orbicular, often broadly cuneate, 0.5 to 2 cm. long, rounded or emarginate at apex; fruit 2.5 to 5.5 cm. long, 0.8 to 1.5 cm. wide, very thin, sessile, often red or purple. Known generally as "brasil" or "palo de brasil," but the names "palo de tinta" and "palo de Campeche" are applied in the south; "azulillo" (Oaxaca); "brasileto" (Colombia).

This species has often been confused with the preceding one, and in commerce no distinction is drawn between the two. The wood is equally valuable, and has been exported in large quantities from the west coast of Mexico. It is used locally for dyeing various objects and is employed as a remedy for jaundice and erysipelas. The plant is described by Hernández[1] in a chapter entitled "De *Curaqua*, seu Brasilio Hispanorum." The accompanying figure is a very poor one and may represent some other plant. He states that the plant was called "curaqua" in Michoacán, "quamochiti" or "vitzquahuitl" by the Mexicans, and "brasil" by the Spaniards. "Its wood dyes thread red, for it is much like sandalwood. The decoction of the juice is at first yellow, but it turns red, and if it is boiled longer, purple, and if mixed with alum, red or vermillion. This tree is refrigerant, febrifuge, astringent, and corroborative."

9. HOFFMANSEGGIA Cav. Icon. Pl. 4: 63. 1797.

Herbs or small shrubs, usually with glandular foliage; leaves bipinnate, the leaflets small; flowers yellow, racemose; fruit linear or oblong, flat, often falcate.

Several herbaceous species of this genus occur in Mexico.

Calyx without black glands; plants leafless or nearly so.

Stems and leaves puberulent or short-pilose.....1. H. microphylla.

Stems and leaves glabrous.....2. H. intricata.

Calyx with black sessile glands; plants usually copiously leafy.

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[1] Thesaurus 121. 1651.

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Leaflets reticulate-veined, glabrous, numerous, with few glands. 3. H. caudata.

Leaflets with obsolete venation, pilose, few, densely black-glandular.

Pubescence of spreading or reflexed hairs.....4. H. melanosticta.

Pubescence of appressed or incurved hairs.....5. H. fruticosa.

1. **Hoffmanseggia microphylla** Torr. U. S. & Mex. Bound. Bot. 58. 1859.

Sonora and Baja California, common in low sandy places. Southern California; type from the Colorado Desert.

Low, usually leafless shrub, 1 to 1.5 meters high, with green branches; flowers 6 to 7 mm. long; fruit 1.5 cm. long.

2. **Hoffmanseggia intricata** T. S. Brandeg. Proc. Calif. Acad. II. 2: 151. 1889.

Hoffmanseggia glabra Fisher, Contr. U. S. Nat. Herb. 1: 147. 1892.

Baja California (type locality) and Sonora.

Shrub, nearly leafless, with rigid spinose branches, forming clumps 45 cm. high; leaflets 1 to 2 mm. long.

3. **Hoffmanseggia caudata** A. Gray, Bost. Journ. Nat. Hist. 6: 179. 1850.

Occurring in Texas at various places along the Rio Grande, and doubtless also on the Mexican side; type collected between the Nueces and the Rio Grande.

Plants low, suffrutescent; leaflets small, pale, coriaceous; racemes few-flowered.

4. **Hoffmanseggia melanosticta** (Schauer) A. Gray, Pl. Wright. 1: 54. 1852.

Pomaria melanosticta Schauer, Linnaea 20: 748. 1847.

Hoffmanseggia melanosticta greggii Fisher, Contr. U. S. Nat. Herb. 1: 149. 1892.

Coahuila to Querétaro. Western Texas (type locality).

Low shrub, densely pubescent, closely covered with viscid black glands; leaflets oval, about 6 mm. long; flowers yellow, in long racemes.

5. **Hoffmanseggia fruticosa** S. Wats. Proc. Amer. Acad. 21: 451. 1886.

Known only from the type locality, Jimulco, Coahuila.

Shrub, about 1.8 meters high.

10. CAESALPINIA L. Sp. Pl. 380. 1753.

Trees or shrubs, sometimes scandent, usually unarmed but sometimes aculeate; leaves bipinnate, the leaflets large or small; flowers yellow or red, racemose, large and showy; fruit very variable, dehiscent or indehiscent.

Several species of *Caesalpinia* and *Poinciana* are described by Sessé and Mociño,[1] but the identification of most of them is doubtful. The following vernacular names are reported for species of uncertain determination: "Tzuraqua" (Michoacán, *Ramírez*); "cahuinga" (Michoacán); "chalate" (Oaxaca).

Fruit covered with long prickles; rachises of the leaves very spiny.

Leaves with foliaceous stipules; seeds gray.....1. C. crista.

Leaves without stipules; seeds yellow.....2. C. jayabo.

Fruit not prickly; rachises of the leaves nearly always unarmed.

Fruit thick and hard or fleshy, indehiscent or tardily dehiscent, or in a few species thin and dehiscent but some of the calyx lobes then pectinate-dentate.

Leaflets linear-oblong, less than 2 mm. wide; fruit curved or coiled. 3. C. coriaria.

[1] Pl. Nov. Hisp. 65–67. 1887.

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Leaflets ovate-oblong to orbicular, 4 to 25 mm. wide or larger.
Calyx lobes entire or nearly so. Plants unarmed.
Leaflets 11 to 20 mm. wide ---------- 4. C. vesicaria.
Leaflets 4 to 8 mm. wide ---------- 5. C. sclerocarpa.
Calyx lobes, at least the outer one, pectinate-dentate.
Plants armed with spines; fruit thick and somewhat fleshy, usually less than 1.5 cm. wide ---------- 6. C. cacalaco.
Plants unarmed; fruit thin, 1.5 to 4 cm. wide.
Leaflets suborbicular, glabrous; fruit 1 or 2-seeded, 1.5 to 2.2 cm. wide ---------- 7. C. gracilis.
Leaflets ovate-oblong to oval, pubescent; fruit several-seeded, 2 to 4 cm. wide ---------- 8. C. platyloba.
Fruit thin, elastically bivalvate; calyx lobes entire.
Inflorescence densely ferruginous-tomentose with stellate hairs. 9. C. eriostachys.
Inflorescence not stellate-tomentose.
Leaves sessile; pinnae one pair; plants armed with spines. 10. C. sessilifolia.
Leaves petiolate; pinnae more than one pair; plants usually unarmed.
Leaflets 6 to 10 pairs or more.
Pinnae 3 or 4 pairs; young branches pilosulous ---------- 11. C. laxa.
Pinnae 5 to 11 pairs or more; branches glabrous ---- 12. C. pulcherrima.
Leaflets usually 3 to 5, sometimes 6 pairs.
Pedicels furnished with sessile or stipitate glands.
Leaflets with black glands along the margins. 13. C. melanadenia.
Leaflets without black glands.
Pedicels and calyx glabrous but furnished with stipitate glands. 14. C. pannosa.
Pedicels and calyx pubescent as well as glandular.
Leaflets 2 to 4.5 mm. wide.
Leaflets oblong, about 2 mm. wide, usually 4 or 5 pairs. 15. C. placida.
Leaflets oval or orbicular, about 4 mm. wide, usually 3 pairs. 16. C. phyllanthoides.
Leaflets 5 to 25 mm. wide.
Pedicels very sparsely glandular; leaflets rhombic. 17. C. gaumeri.
Pedicels densely glandular; leaflets obovate, ovate, or oval.
Fruit very glandular; leaflets 3 or 4 pairs, 5 to 14 mm. wide ---------- 18. C. caladenia.
Fruit not glandular; leaflets 2 pairs, 10 to 23 mm. wide. 19. C. acapulcensis.
Pedicels without glands.
Pedicels jointed below the middle ---------- 20. C. californica.
Pedicels jointed above the middle, often at the base of the calyx.
Leaflets small, 2 to 5 mm. wide. Calyx densely pubescent. 21. C. palmeri.
Leaflets large, most of them 6 to 20 mm. wide or larger.
Calyx tube 6 mm. wide or less; stamens about as long as the petals ---------- 22. C. mexicana.
Calyx tube 8 to 11 mm. wide; stamens often long-exserted.
Stamens long-exserted ---------- 23. C. exostemma.
Stamens about equaling the petals ---- 24. C. yucatanensis.

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1. **Caesalpinia crista** L. Sp. Pl. 380. 1753.

Guilandina bonducella L. Sp. Pl. ed. 2. 545. 1762.

Caesalpinia bonducella Fleming, Asiat. Res. 11: 159. 1810.

Along beaches on both coasts of Mexico. Widely distributed on tropical and subtropical coasts of both hemispheres.

Straggling or sprawling, armed with very numerous straight or recurved prickles; leaflets ovate to orbicular, 1.5 to 4 cm. long, rounded or obtuse at apex, pubescent when young, glabrate in age; flowers small, greenish yellow; fruit 6 to 8 cm. long and nearly as broad, densely prickly; seeds usually 2, gray, nearly 2 cm. in diameter. "Cojones de gato" (Yucatán); "jabilla" (Veracruz); "haba de San Antonio" (Veracruz, *Dugès*); "taray" (Veracruz, *Ramírez*); "brasil" (Oaxaca); "guacolote" (*Nueva Farmacopea Mexicana*); "guacolote prieto," "brasilete colorado," "palo fernambuco," (Cuba); "mato de playa," "mato azul" (Porto Rico).

A characteristic strand plant, often forming impenetrable thickets of considerable extent. The large seeds (known as "nicker-nuts") are so hard that it requires a heavy blow of a hammer to break them. They retain their vitality for a long time, and are transported by ocean currents for great distances, having been carried occasionally from tropical America to European shores. They contain about 23 per cent of oil, which has been extracted in some regions. They are very bitter and contain a principle known as bonducine, which is believed to possess tonic and antiperiodic properties. The seeds have been used in domestic medicine (and even employed in Europe in times past) as a substitute for quinine, and also as a remedy for dropsy, snake bites, and venereal diseases. They are often carried by the natives of tropical America as talismans or amulets, and are used by children as marbles.

It is presumably this species which has been reported from Mexico as *C. echinata* Lam., a Brazilian species, and said to be known as "brasil" and "hoitzquahuitl" or "huitzquahuitl." The writer has seen no specimens of the plant, which may be some other species. It is said to be exported as a dyewood. For an illustration of the seeds see Contr. U. S. Nat. Herb. 9: *pl. 15*.

2. **Caesalpinia jayabo** Maza, Anal. Soc. Esp. Hist. Nat. 19: 234. 1880.

Reported from Veracruz by Urban,[1] but the writer has seen no Mexican specimens. West Indies and East Indies.

Prickly shrub, similar to the preceding but with large yellow seeds. Known in Cuba as "guacolote amarillo" and in Porto Rico as "mato amarillo."

This is *C. bonduc* of most authors, but scarcely *Guilandina bonduc* L., which is synonymous with the preceding species.

3. **Caesalpinia coriaria** (Jacq.) Willd. Sp. Pl. 2: 532. 1799.

Poinciana coriaria Jacq. Stirp. Amer. 123. *pl. 75. f. 36*. 1763.

Sinaloa to Oaxaca. West Indies, Central America, and northern South America.

Unarmed shrub or tree, 3 to 9 meters high, the trunk sometimes 40 cm. in diameter, the crown broad and spreading; bark rough, gray; leaflets numerous, 4 to 8 mm. long, glabrate, dotted with black glands; flowers small, white or yellowish, in short racemes; fruit short, 1.5 to 2 cm. wide, dark brown, lustrous, curved or coiled; sapwood light orange yellow, the heartwood dark, sometimes nearly black, very hard, heavy, tough, close-grained, taking a fine polish. "Cascalote" (Oaxaca, Michoacán, Guerrero, Chiapas, Colima); "nacascoloti" (*Altamirano*); "nacascul" (Oaxaca, Guerrero); "nacascol" (Nicaragua, Costa Rica); "nacasolo" (Nicaragua); "nacasco-

[1] Symb. Antill. 2: 273. 1900.

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lote" (Guatemala); "agallo" (Panama); "dibidibi" or "dividivi" (Cuba, Santo Domingo, Colombia, Venezuela; also the commercial name); "guatapán," "guatapanare" (Venezuela); "guatapaná" (Cuba, Santo Domingo); "guastapana" (Santo Domingo); "libidibi" (Colombia).

The pods contain 25 to 30 per cent of tannin. They are used locally for tanning and have been exported in large quantities from Mexico and other parts of tropical America for that purpose. They have been employed in Mexico for making ink and are said to have been so used by the early inhabitants. The pods yield a black dye and the wood is said to give a red one. The tree was introduced into India early in the nineteenth century and has been much planted there. One tree is said to yield as much as 100 pounds of the pods. These have been exported to England, under the name of "divi-divi" or "dibi-dibi," where they brought $40 to $65 per ton.

4. **Caesalpinia vesicaria** L. Sp. Pl. 381. 1753.

Yucatán. Cuba, Jamaica, and Curaçao.

Shrub or small tree, 3.5 to 4.5 meters high, unarmed; leaflets few, very broadly cuneate, 1 to 3 cm. long, usually emarginate, thick, lustrous, glabrous; flowers yellow; fruit 6 to 7 cm. long, about 1.5 cm. wide, thick and hard. Known in Cuba as "guacamaya de costa," "palo Campeche," or "palo negro."

5. **Caesalpinia sclerocarpa** Standl. Contr. U. S. Nat. Herb. **20**: 214. 1919.

Sinaloa to Oaxaca; type collected between San Gerónimo and La Venta, Oaxaca.

Unarmed tree, 10 to 14 meters high, with a trunk 50 to 60 cm. in diameter; leaflets oblong or oval, 1 to 1.8 cm. long, glabrous; flowers yellow; fruit very hard, blackish, indehiscent, 5 to 8 cm. long, nearly 2 cm. wide. "Ébano" (Sinaloa).

The wood is valuable for carpenter work.

6. **Caesalpinia cacalaco** Humb. & Bonpl. Pl. Aequin. **2**: 173. *pl. 137*. 1809.

Sinaloa to Puebla and Oaxaca; type collected between Chilpancingo and Zumpango, Guerrero.

Shrub or sometimes a large tree, often grown as a shade tree, usually very spiny; bark gray, very rough; leaflets few, oval or suborbicular, 1 to 2.5 cm. long, glabrous or nearly so; flowers large, in long racemes; fruit 10 to 15 cm. long, 1 to 1.5 cm. wide, red or reddish, somewhat succulent, somewhat constricted between the seeds. "Huisache" (Sinaloa; sometimes written "huizache"); "cascalote" (Michoacán, Oaxaca, Guerrero); "nacascul" (Guerrero, Oaxaca); "chalalá" (Oaxaca).

This tree is often confused in literature with *C. coriaria*, although the two species are very unlike in most of their characters. The fruit of *C. cacalaco* has the same properties as that of *C. coriaria*.

7. **Caesalpinia gracilis** Benth.; Hemsl. Diag. Pl. Mex. 9. 1878.

Sonora.

Slender unarmed shrub, 1 to 2 meters high, with reddish brown branches; leaflets few, 1 to 1.5 cm. long, glabrous; flowers few, yellow; fruit oval or rounded, about 3 cm. long, pale reddish brown, glabrous, usually with 2 large seeds. "Vara prieta."

The branches are sometimes used by the Indians for making baskets.

8. **Caesalpinia platyloba** S. Wats. Proc. Amer. Acad. **21**: 425. 1886.

Chihuahua to San Luis Potosí, Oaxaca, and Sinaloa; type from Hacienda San Miguel, Chihuahua.

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Shrub or small tree, 1.8 to 6 meters high, unarmed; leaflets 2 to 5.5 cm. long, pubescent; flowers yellow, the largest sepal pectinate-lobed; fruit 6 to 13 cm. long, flat, velvety-pubescent, thin but apparently indehiscent; seeds large, flat, brownish. "Palo colorado" (Chihuahua, Sinaloa).

A similar or perhaps the same species occurs in Yucatán, where it is known as "chacte." The writer has seen only flowering specimens, which matched those of *C. platyloba;* the fruit, however, may be different. One of the collections was determined by Greenman as *C. cubensis* Greenm., but that name is probably synonymous with *C. pectinata* Cav. (*Coulteria tinctoria* H. B. K.), a species in which the fruit is very different from that of *C. platyloba.*

9. Caesalpinia eriostachys Benth.; Seem. Bot. Voy. Herald 88. 1853.

Sinaloa to Guerrero. Central America; type from Costa Rica.

Shrub or small tree, sometimes 6 meters high, with an irregular trunk 20 cm. in diameter; leaflets numerous, oval or rhombic, 4 to 11 mm. long, dotted with black glands; flowers large, yellow, in long racemes; fruit 7 to 12 cm. long, 2 to 2.5 cm. wide, puberulent, flat, dehiscent. "Iguanero" (Michoacán, Guerrero); "iguano" (Sinaloa); "palo alejo" (Colima, Oaxaca); "zahino" or "zajino" (Costa Rica, Nicaragua).

It is reported that in Colima the crushed bark is thrown in water to stupefy fish.

10. Caesalpinia sessilifolia S. Wats. Proc. Amer. Acad. 21: 450. 1886.

Poinciana sessiliflora Rose, Contr. U. S. Nat. Herb. 13: 303. 1911.

Coahuila and Durango; type from Bolsón de Mapimi.

Spiny shrub, 1 to 2 meters high; leaflets suborbicular, 6 to 13 mm. long, pale, glabrous; flowers few, yellow; fruit short and broad, glabrate.

11. Caesalpinia laxa Benth. Pl. Hartw. 60. 1840.

Type from Teojomulco, Oaxaca; reported also from Nuevo León.

Shrub, 0.9 to 1.2 meters high, nearly glabrous; leaflets 6 to 9 pairs, oval-elliptic, 6 to 8 mm. long, glabrous.

12. Caesalpinia pulcherrima (L.) Swartz, Obs. Bot. 166. 1791.

Poinciana pulcherrima L. Sp. Pl. 380. 1753.

Cultivated nearly throughout Mexico and often escaped from cultivation. Widely cultivated and naturalized in the tropics of both hemispheres, its native habitat unknown.

Glabrous shrub or small tree, 1 to 6 meters high, unarmed or prickly, the trunk rarely more than 10 cm. in diameter; bark thin, nearly smooth, brown; leaflets oblong to obovate, 1.5 to 2.5 cm. long, pale beneath; flowers very large, red, more or less variegated with yellow, or sometimes wholly yellow; fruit flat, about 10 cm. long and 2 cm. wide; wood soft and weak, orange, fine-grained. "Flor de San Francisco" (Guerrero); "tabachín," "tabachino," or "tabaquín" (Nuevo León, Guerrero, Durango, Sinaloa, Baja California); "tabachín amarillo" (Jalisco); "flor de guacamaya" (Oaxaca, Chiapas); "chacsickin," "kansickin" (yellow-flowered form) (Yucatán, Maya); "flor del camarón" (Veracruz, Guerrero); "chamolxochitl" (Nahuatl); "chalcasúchil" (from the Nahuatl *chacal-xochitl*, "shrimp-flower"); "sirundaniqua" (Michoacán, Tarascan, *Ramírez*); "xiloxóchitl" (Puebla, Nahuatl); "maravilla moreña" (Oaxaca); "tabachil" (Sinaloa): "guacamaya" or "guacamayo" (Nicaragua, Guatemala, Colombia, El Salvador); "clavellina" (Colombia, El Salvador, Costa Rica, Porto Rico); "hoja de sen" (Costa Rica); "flor barbona" (El Salvador, Guatemala); "flor de ángel," "florito," "flor de pavo" (Colombia); "hierba del espanto," "espanta-lobos," "gallito," "Santa Rosa," "flor de

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chapa" (Guatemala); "cuacamaya" (Cuba); "malinche,"[1] "guacamaya pequeña" (Nicaragua); "barbón" (El Salvador); "caballero" (Philippines); "carzazo" (Santo Domingo).

The English names are "Barbados-flower," "Barbados-pride," "flower-fence," and "bird-of-paradise flower." The flowers are sweet-scented and are said to yield a good quality of honey. The fruit contains tannin and is sometimes used for tanning skins. It is said to give a yellow dye with alum and a black dye with iron salts, and the root is reported to yield a red dye. In India the charred wood is used to make ink. The large seeds are sometimes cooked and eaten when green. In Sinaloa it is reported that a kind of rubber is extracted from the seeds and made into balls or "pelotas." In domestic medicine the plant is employed in many ways. The leaves are sometimes used to adulterate senna. The early inhabitants of Mexico used a decoction of the leaves for liver affections and as a wash for ulcers of the mouth and throat. The flowers are reputed to have purgative, febrifuge, and emmenagogue properties, and a decoction is a popular remedy for erysipelas and for inflammation of the eyes. In Nicaragua the astringent infusion of the bark is used as a wash for the teeth and gums. Infusions of the leaves, roots, or bark are employed in various places for colds, fevers, cutaneous diseases, and as a purge, and are said even to induce abortion. It is reported that in Guatemala the leaves are thrown in water to stupefy fish.

A related species, *C. gilliesii* (Hook.) Wall., known as "bird-of-paradise flower," is sometimes cultivated in northern Mexico. It is distinguished by the copious pubescence and very viscid inflorescence.

13. Caesalpinia melanadenia (Rose) Standl.

Poinciana melanadenia Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Puebla and Oaxaca; type from Tehuacán, Puebla.

Low shrub with reddish brown branches; leaflets oval or obovate, about 5 mm. long.

14. Caesalpinia pannosa T. S. Brandeg. Proc. Calif. Acad. II. **2**: 150. 1889.

Poinciana pannosa Rose, Contr. U. S. Nat Herb. **13**: 303. 1911.

Baja California; type from San Jorge.

Unarmed shrub, 0.6 to 1.2 meters high; bark white, peeling in thin sheets; leaflets oval, 7 to 15 mm. long, glabrous; flowers pale yellow, in lax racemes; fruit flat, about 4 cm. long and 1.5 cm. wide, bearing numerous small black glands.

15. Caesalpinia placida T. S. Brandeg. Proc. Calif. Acad. II. **3**: 131. 1891.

Poinciana placida Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Baja California; type from La Paz.

Unarmed shrub, 1 to 3.5 meters high; bark dark brown; leaflets oblong, 4 to 6 mm. long, gland-dotted; inflorescence very glandular; flowers bright yellow, the calyx and pedicels dark red.

16. Caesalpinia phyllanthoides Standl., sp. nov.

Type from Hacienda Buena Vista, Tamaulipas (*Wooton*, June 18, 1919; U. S. Nat. Herb. no. 989730).

Low slender shrub with glabrous branchlets; leaves 5 to 9 cm. long, long-petioled, glabrous; pinnae 3 or 4 pairs, long-stalked; leaflets usually 3 pairs, 3 to 7 mm. long, 3 to 4.5 mm. wide, orbicular to oval, subcoriaceous, with rather

[1]Derived from the Nahuatl, *malichtic*, a plume, especially one worn on the head (*panache*), referring to the long hairlike stamens. Malinche was also the name given to Cortés, because of his association with the Indian woman Malintzin or Marina, who during the Conquest acted as interpreter between the Mexicans and Spaniards.

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prominent venation beneath, paler beneath, short-petiolulate, eglandular; racemes terminal, few-flowered; pedicels finely puberulent and furnished with scattered short-stipitate glands; sepals about 7 mm. long, puberulent and glandular, glandular-ciliate; petals only slightly exceeding the sepals; fruit flat, elastically dehiscent, 2.5 cm. long, 1.3 cm. wide, glabrous but with a few scattered dark glands.

17. Caesalpinia gaumeri Greenm. Field Mus. Bot. **2**: 330. 1912.

Yucatán; type from Progreso.

Tree, 15 to 20 meters high, unarmed; leaflets 2 to 3 cm. long, glabrate; flowers yellow, in long racemes. "Xcitinche."

18. Caesalpinia caladenia Standl. Contr. U. S. Nat. Herb. **20**: 214. 1919.

Sonora to Colima; type collected below Minas Nuevas, Sonora.

Unarmed shrub; leaflets oval, 1 to 3 cm. long, glabrous; flowers large, yellow; fruit flat, about 7 cm. long and 1.5 cm. wide, straight or falcate, bearing numerous small reddish glands.

19. Caesalpinia acapulcensis Standl. Contr. U. S. Nat. Herb. **20**: 213. 1919.

Known only from Acapulco, Guerrero, the type locality.

Unarmed shrub; leaflets 2.5 to 4 cm. long, rounded at apex, glabrous, pale beneath; fruit 7 cm. long, 1.7 cm. wide, puberulent.

20. Caesalpinia californica (A. Gray) Standl.

Caesalpinia mexicana californica A. Gray, Proc. Amer. Acad. **5**: 157. 1862.

Poinciana californica Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Baja California.

Unarmed shrub, 1 to 4.5 meters high; leaflets few, oval, 1 to 2 cm. long, glabrous; flowers yellow; fruit about 4.5 cm. long and 1.3 cm. wide, velvety-puberulent.

Perhaps not essentially different from *C. pannosa*.

21. Caesalpinia palmeri S. Wats. Proc. Amer. Acad. **24**: 47. 1889.

Poinciana palmeri Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Baja California, Sonora, and Sinaloa; type from Guaymas, Sonora.

Shrub or small tree, 1 to 4.5 meters high; leaflets 4 to 15 mm. long, usually glabrous but sometimes pubescent; calyx pubescent; flowers yellow, in very short racemes; fruit about 5.5 cm. long and 1.5 cm. wide, velvety-puberulent, tinged with purple.

22. Caesalpinia mexicana A. Gray, Proc. Amer. Acad. **5**: 157. 1862.

Caesalpinia mexicana pubescens Robins. & Greenm. Proc. Amer. Acad. **29**: 386. 1894.

Poinciana mexicana Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Sinaloa to Tamaulipas and Guerrero; type from Nuevo León.

Unarmed shrub or small tree, 1.5 to 6 meters high; leaflets oblong to suborbicular, 1 to 2.5 cm. long; flowers rather large, yellow, in very long racemes; fruit flat, about 6 cm. long and 1.5 cm. wide. "Retamilla" (Nuevo León); "tabachín del monte" (Tamaulipas).

A rather variable species; calyx usually glabrous but sometimes pubescent. The form found on the Pacific Coast differs slightly from the more eastern one; intermediate forms occur also. Here probably belong sterile specimens of a Oaxaca tree known as "ébano" and "guayavillo."

23. Caesalpinia exostemma DC. Prodr. **2**: 483. 1825.

Poinciana conzattii Rose, Contr. U. S. Nat. Herb. **13**: 303. 1911.

Oaxaca; also reported to range from Jalisco to Chiapas. Guatemala to Nicaragua.

Small tree, 3 to 4.5 meters high, unarmed; leaflets oblong to oval, 1 to 3 cm. long, pubescent or glabrate; flowers large and showy, yellow; fruit 8 to

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11 cm. long, 2 cm. wide, velvety-puberulent. "Hojasén," "hojasén del país," "sen," "sen del país," "yagati," "guete-règl" (Oaxaca, *Seler*).

24. Caesalpinia yucatanensis Greenm. Field Mus. Bot. **2**: 252. 1907.

Veracruz and Yucatán; type from Izamal, Yucatán.

Shrub or tree; leaflets oblong to oval, 1.5 to 3.5 cm. long; flowers yellow, large and showy; fruit about 6.5 cm. long and 1.8 cm. wide, velvety-pubescent. "Xkanpocolcum" (Yucatán).

Doubtfully distinct from *C. exostemma*.

DOUBTFUL SPECIES.

ROBINIA PYRAMIDATA Mill. Gard. Dict. ed. 8. *Robinia* no. 7. 1708. Type from Campeche.

11. DELONIX Raf. Fl. Tellur. 2: 92. 1836.

1. Delonix regia (Boj.) Raf. Fl. Tellur. **2**: 92. 1836.

Poinciana regia Boj.; Hook. in Curtis's Bot. Mag. *pl. 2884*. 1829.

Widely cultivated in Mexico as a shade tree and sometimes growing without cultivation. Native of Madagascar and tropical Africa, but planted commonly in all tropical regions.

Large tree, usually 10 to 20 meters high, with wide-spreading crown, the trunk sometimes a meter in diameter; bark thin, grayish brown, slightly furrowed; leaves bipinnate, deciduous, the leaflets numerous, oblong, 4 to 10 mm. long, pubescent; flowers racemose-corymbose, the petals 5 to 7 cm. long, orange-red or scarlet; fruit dark brown, flattened, often 60 cm. long; wood whitish or yellowish, close-grained but soft and weak, its specific gravity about 0.83. "Tabuchín" or "tabuchín" (Oaxaca, Sinaloa); "framboyán" or "frambayano" (Veracruz; a corruption of the French "flamboyant"); "espuela de caballero," "flor del camarón" (Oaxaca, *Reko*); "árbol del fuego" (various parts of Mexico, Guam, Philippines); "pata león" (Tamaulipas); "caballero" (Philippines).

The English names are "flame-tree," "royal poinciana," and "peacock-flower." This is one of the most widely planted trees in the tropics, and when covered with its huge bunches of brilliant flowers it is extremely showy. When leafless the trees are rather unsightly, and their wood is so weak that they are often broken by wind. For an illustration of the tree see Contr. U. S. Nat. Herb. **8**: *pl. 54*.

12. CONZATTIA Rose, Contr. U. S. Nat. Herb. 12: 407. 1909.

Shrubs or small trees, unarmed; leaves bipinnate, with numerous small leaflets; flowers showy, bright yellow, in long slender axillary racemes; fruit flat, few-seeded, very acute at both ends, narrowly winged along the edges.

The genus was named in honor of Dr. C. Conzatti, of Oaxaca, a botanist well known for his extensive collections and publications upon the Mexican flora.

Leaflets glabrous on the upper surface ..... 1. C. multiflora.
Leaflets sericeous on the upper surface ..... 2. C. sericea.

1. Conzattia multiflora (Robinson) Standl.

Caesalpinia multiflora Robinson, Proc. Amer. Acad. **27**: 167. 1892.

Conzattia arborea Rose, Contr. U. S. Nat. Herb. **12**: 408. 1909.

Michoacán to Puebla and Oaxaca; type from Monte León Pass, Michoacán.

Large shrub or small tree, nearly glabrous, 3 to 8 meters high, with broad spreading crown, the trunk 10 to 30 cm. in diameter; leaves large, with numerous small leaflets, these oblong, 1 to 1.8 cm. long, obtuse; flowers showy, yellow, in slender racemes; fruit 8 to 15 cm. long, 1 to 1.5 cm. wide, flat, very acute, with 3 or 4 seeds.

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2. Conzattia sericea Standl., sp. nov.

Type from Río de Tamazula, Imala, Municipalidad de Culiacán, Sinaloa, altitude 80 meters (*J. G. Ortega* 4169; U. S. Nat Herb. no. 1,081,254).

Tree, 10 to 15 meters high, the trunk 50 to 75 cm. in diameter, the young branchlets at first puberulent but soon glabrate; leaves long-petiolate, the pinnae few, the leaflets about 9 pairs, oblong, 10 to 12 mm. long, obtuse and apiculate, sericeous on both surfaces, more densely so beneath; racemes 8 to 25 cm. long, glabrous, the pedicels 6 to 9 mm. long; sepals 5 mm. long, very obtuse; petals bright yellow, 7mm. long. "Navío."

The pinnae and leaflets are less numerous than in *C. multiflora.*

13. PARKINSONIA L. Sp. Pl. 375. 1753.

Trees or shrubs, armed with spines; leaves pinnate, the leaflets numerous, small; flowers showy, yellow, in axillary racemes; fruit linear, nearly terete, constricted between the seeds.

Rachis of the leaves long, flat, winged; leaflets 20 to 30 pairs____1. P. aculeata.
Rachis of the leaves short, not winged; leaflets 4 to 6 pairs_2. P. microphylla.

1. Parkinsonia aculeata L. Sp. Pl. 375. 1753.

Common nearly throughout Mexico; often planted. Widely distributed in tropical America; western Texas.

Slender graceful shrub or tree, sometimes 12 meters high, the trunk 30 cm. or less in diameter; branches yellowish green, the bark brown in age, smooth; leaf rachis 20 to 40 cm. long, the leaflets 3 to 8 mm. long, pale green, deciduous, leaving the persistent naked rachis; flowers pale yellow, fragrant; pods 5 to 10 cm. long; wood hard, close-grained, light brown with yellowish sapwood, the specific gravity about 0.61. "Retama" (Nuevo León, Tamaulipas, Sinaloa, Texas, Costa Rica, Colombia); "retama de cerda" (Tamaulipas); "guacóporo" (Sonora, Tamaulipas, Guanajuato); "junco" (Guanajuato, San Luis Potosí); "palo verde" (Oaxaca, Tamaulipas); "mezquite extranjero" (Durango); "guichi-belle" (Oaxaca, Zapotec, *Reko*); "acacia de agüijote," "espino real de España" (Nicaragua); "calentano," "yabo" (Colombia); "flor de rayo," "palo de rayo" (Porto Rico); "junco marino," "espinillo" (Cuba); "espinillo de España" (Venezuela); "cambrón" (Santo Domingo).

The foliage and young branches are eaten by stock. The wood is used for fuel, and has been employed for making paper. The infusion of the leaves is employed locally as a febrifuge and sudorific, a remedy for epilepsy, and an abortefacient.

2. Parkinsonia microphylla Torr. U. S. Rept. Expl. Miss. Pacif. 4: 82. 1857.

Dry plains and hillsides, Sonora and Baja California. Southern California (type locality) and Arizona.

Spiny shrub or tree, 1 to 7.5 meters high, the trunk 30 cm. or less in diameter; bark smooth, yellowish green; leaflets 2 to 4 mm. long, pubescent; flowers pale yellow; fruit 5 to 8 cm. long; wood hard, close-grained, dark yellowish brown with yellow sapwood, with a specific gravity of about 0.74. "Retama," "lebón" (Baja California); "palo verde" (Sonora, California).

By the Pima Indians of Arizona the pods were eaten, either as gathered or after having been ground in a mortar. The coarse meal thus obtained was sometimes mixed with that of mesquite pods. The wood was used for making small articles, such as ladles.

14. CERCIDIUM Tulasne, Arch. Mus. Paris 4: 133. 1844.

Trees or shrubs, armed with axillary spines; leaves bipinnate, the leaflets few, small; flowers showy, yellow, few, in axillary racemes; fruit flat or swollen, finally dehiscent.

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Pedicels glabrous or with few scattered appressed hairs_____1. C. floridum.
Pedicels copiously pilose with very short spreading hairs.
Younger branches densely pilose with short whitish hairs.
2. C. peninsulare.
Younger branches glabrous or nearly so, sometimes finely puberulent.
Pods turgid when mature; seeds 5 to 7 mm. wide_____3. C. torreyanum.
Pods very flat; seeds about 3.5 mm. wide_____4. C. plurifoliolatum.

1. **Cercidium floridum** Benth.; A. Gray, Pl. Wright. 1: 58. 1852.

Coahuila to Tamaulipas. Southwestern Texas.

Spiny tree with crooked branches, sometimes 6 meters high, the trunk up to 25 cm. thick; bark thin, green or greenish brown; leaflets 2 to 4 pairs, 4 to 6 mm. long; flowers golden yellow, about 2 cm. broad, sweet-scented, in short racemes; fruit 4 to 6 cm. long, brownish yellow; wood soft, close-grained, greenish yellow, with a specific gravity of about 0.54. "Retama" (Tamaulipas); "palo verde" (Texas).

The wood is of little use except for fuel.

2. **Cercidium peninsulare** Rose, Contr. U. S. Nat. Herb. 8: 301. 1905.

Southern Baja California, common at low and middle elevations; type from La Paz.

Shrub or small tree, 1 to 7.5 meters high, closely resembling the next species and doubtfully distinct from it; spines short and stout; leaflets 5 to 10 mm. long, pubescent. "Palo verde," "palo de púa."

The young branches are sometimes cut and fed to horses and mules. For an illustration of a tree see Contr. U. S. Nat. Herb. 16: *pl. 114*.

3. **Cercidium torreyanum** (S. Wats.) Sarg. Gard. & For. 2: 388. 1889.

Parkinsonia torreyana S. Wats. Proc. Amer. Acad. 11: 135. 1876.

Sonora to Tepic. Southern Arizona (type from the Lower Colorado River) and California.

Small tree, sometimes 9 meters high, with a trunk 50 cm. in diameter; bark bright green; leaflets 2 or 3 pairs, 3 to 6 mm. long; fruit 8 to 10 cm. long, about 1 cm. wide; wood soft, weak, close-grained, light brown, with yellow sapwood, the specific gravity about 0.65. "Palo verde" (Sonora, California, Arizona).

The Indians of Arizona ground the fruit in a mortar and used it for food, especially in the form of atole. The wood was employed for various purposes.

4. **Cercidium plurifoliolatum** Micheli, Mém. Soc. Phys. Nat. Hist. Genève 34: 269. *pl. 18*. 1903.

Cercidium goldmani Rose, Contr. U. S. Nat. Herb. 8: 301. 1905.

Cercidium unijuga Rose, Contr. U. S. Nat. Herb. 8: 301. 1905.

Michoacán to Puebla and Oaxaca; type from San Luis (Guerrero ?).

Tree, 4.5 to 12 meters high, the green branches armed with stout spines; leaflets mostly 5 to 8 pairs, 5 to 8 mm. long, pubescent; fruit thin, 4 to 7 cm. long, 8 mm. wide. "Palo de berria," "mantecoso," "palo mantecoso" (Oaxaca).

67. FABACEAE. Bean Family.

Trees or shrubs, often scandent; leaves alternate, stipulate, usually compound; flowers often large and showy, very irregular; fruit a legume, sometimes variously modified.

One of the largest and most important groups of Mexican plants. Many herbaceous species occur also. Perhaps some species of genera not included here, especially of *Phaseolus*, deserve to be classed as shrubs. Two species of *Ormocarpum* have been reported from Mexico, but they are unknown to the

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writer. *Copaifera*, also, has been reported, but there is no reason to believe that the genus belongs to the Mexican flora.

Coumarouna oleifera (Benth.) Taub.[1] was described, or rather mentioned, as the "Eboe-tree of the Mosquito shore." Hemsley gives the distribution as "Mexico; Honduras," but it is very doubtful whether the plant occurs in Mexico.

Stamens free.
- Leaves digitately 3-foliolate ..... III. Podalyrieae.
- Leaves pinnate (rarely 1-foliolate).
  - Leaflets 1 to 3; petal 1 ..... I. Swartzieae.
  - Leaflets 5 or more; petals 1 or 5 ..... II. Sophoreae.

Stamens monadelphous or diadelphous.
- Fruit breaking up into joints ..... VI. Hedysareae.
- Fruit continuous, not jointed.
  - Leaves digitately 3-foliolate ..... IV. Genisteae.
  - Leaves pinnate or rarely simple.
    - Leaflets 3 (rarely 5); plants usually scandent; fruit bivalvate. VIII. Phaseoleae.
    - Leaflets usually 7 or more, or the leaves simple; plants usually erect; fruit often indehiscent.
      - Leaves even-pinnate.
        - Plants scandent ..... VII. Vicieae.
        - Plants erect ..... VI. Hedysareae.
      - Leaves odd-pinnate or simple.
        - Fruit large, indehiscent ..... IX. Dalbergieae.
        - Fruit dehiscent, or very small and indehiscent ..... V. Galegeae.

Tribe I. Swartzieae.

A single genus ..... 1. TOUNATEA.

Tribe II. Sophoreae.

Petal 1. Fruit short; ovules 2 ..... 2. ATELEIA.

Petals 5.
- Ovule 1 ..... 3. TOLUIFERA.
- Ovules 2 or more.
  - Stamens long-exserted ..... 4. SWEETIA.
  - Stamens not exserted.
    - Calyx short-dentate ..... 5. SOPHORA.
    - Calyx deeply lobate ..... 6. ORMOSIA.

Tribe III. Podalyrieae.

A single genus ..... 7. XYLOTHERMIA.

Tribe IV. Genisteae.

A single genus in Mexico ..... 8. CROTALARIA.

Tribe V. Galegeae.

Hairs of the pubescence usually attached by the middle; connective of the anther appendaged ..... 9. INDIGOFERA.

Hairs attached by the base; connective not appendaged.
- Seeds usually 1 or 2; leaves gland-dotted.
  - Seed 1 ..... 10. APOPLANESIA.

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[1] Taub. Bot. Centralbl. 47: 389. 1891. *Dipteryx oleifera* Benth. in Hook. Journ. Bot. 2: 235. 1850.

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Seeds 2 or rarely more.
Corolla of a single petal ..... 11. **AMORPHA.**
Corolla of 5 petals.
Stamens diadelphous ..... 12. **EYSENHARDTIA.**
Stamens monadelphous ..... 13. **PAROSELA.**
Seeds several or numerous; leaves not gland-dotted.
Seeds with a small appendage (strophiole).
Stamens monadelphous ..... 14. **HARPALYCE.**
Stamens diadelphous ..... 15. **BRONGNIARTIA.**
Seeds not appendaged.
Inflorescence terminal or leaf-opposed.
Style bearded on the inner side ..... 16. **BARBIERIA.**
Style glabrous or bearded only at apex ..... 17. **CRACCA.**
Inflorescence axillary.
Fruit with 1 or 4 wings (the wings sometimes very narrow).
Fruit winged on the upper edge; plants usually spiny. 18. **ROBINIA.**
Fruit with 4 longitudinal wings; plants unarmed. 19. **DAUBENTONIA.**
Fruit not winged.
Fruit with inner cross-partitions.
Style glabrous ..... 20. **SESBAN.**
Style bearded ..... 21. **BENTHAMANTHA.**
Fruit 1-celled.
Fruit much inflated, bladder-like ..... 22. **DIPHYSA.**
Fruit not inflated.
Style coiled. Plants glabrous or nearly so ..... 23. **LENNEA.**
Style straight or slightly curved.
Style bearded.
Plants usually unarmed ..... 24. **COURSETIA.**
Plants very spiny ..... 25. **OLNEYA.**
Style glabrous or nearly so.
Stamens diadelphous ..... 26. **GLIRICIDIA.**
Stamens monadelphous.
Leaves estipellate ..... 27. **WILLARDIA.**
Leaves stipellate ..... 28. **HESPEROTHAMNUS.**

Tribe VI. Hedysareae.

Leaflets 1 or 3 ..... 29. **MEIBOMIA.**
Leaflets 4 or more, often numerous.
Terminal joint of the fruit samara-like, with a large terminal wing. Plants scandent ..... 30. **NISSOLIA.**
Terminal joint not winged.
Leaflets 4 or 6, emarginate at apex. Flowers large, yellow ..... 31. **AMICIA.**
Leaflets 8 to many, rarely if ever emarginate.
Leaflets pungent-pointed, minute ..... 32. **PICTETIA.**
Leaflets never pungent.
Fruit jointed ..... 33. **AESCHYNOMENE.**
Fruit not jointed ..... 34. **CLIMACORACHIS.**

Tribe VII. Vicieae.

A single genus ..... 35. **ABRUS.**

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Tribe VIII. Phaseoleae.

Style bearded.
- Calyx teeth subequal ..... 36. RAMIREZELLA.
- Calyx teeth very unequal ..... 37. CLITORIA.

Style glabrous.
- Vexillar stamen free at the base but united above with the other stamens.
  - Lower calyx lobe well developed ..... 38. DIOCLEA.
  - Lower calyx lobe minute ..... 39. CANAVALIA.
- Vexillar stamen free, or united with the others at the base.
  - Plants erect.
    - Ovules 1 or 2. Flowers usually yellow.
      - Seeds transverse ..... 40. ERIOSEMA.
      - Seeds longitudinal ..... 41. DOLICHOLUS.
    - Ovules usually numerous, at least more than 2.
      - Plants usually armed with spines; calyx very oblique, truncate, bilobate, or with very short teeth ..... 42. ERYTHRINA.
      - Plants unarmed; calyx deeply lobate or dentate.
        - Upper calyx lobe entire; leaflets not gland-dotted. 43. GALACTIA.
        - Upper calyx lobe bidentate; leaflets gland-dotted beneath. 44. CAJANUS.
  - Plants scandent or trailing.
    - Ovules 1 or 2 ..... 40. DOLICHOLUS.
    - Ovules numerous.
      - Calyx bilobate, the lobes entire; fruit usually hispid with bristle-like hairs ..... 45. MUCUNA.
      - Calyx 4 or 5-lobate; fruit not hispid.
        - Upper 2 calyx lobes united into an entire lobe ..... 43. GALACTIA.
        - Upper 2 calyx lobes distinct or forming a bidentate lobe.
          - Bracts and bractlets striate, persistent ..... 46. BRADBURYA.
          - Bracts and bractlets not striate, caducous. 47. CALOPOGONIUM.

Tribe IX. Dalbergieae.

Fruit drupaceous, 1-seeded ..... 48. ANDIRA.

Fruit not drupaceous, usually with more than 1 seed.
- Anther cells erect and dehiscent by a short terminal slit or divergent and dehiscent by longitudinal slits ..... 49. AMERIMNON.
- Anther cells parallel, longitudinally dehiscent.
  - Leaflets alternate.
    - Calyx acute at base; fruit suborbicular or broadly oblong. 50. PTEROCARPUS.
    - Calyx obtuse at base; fruit circinate or samara-like.
      - Fruit circinate, not winged ..... 51. DREPANOCARPUS.
      - Fruit winged, samara-like ..... 52. MACHAERIUM.
  - Leaflets opposite (rarely only 1).
    - Wing petals free from the keel. Ovule 1; fruit thin. 53. PLATYMISCIUM.
    - Wing petals adherent to the keel.
      - Fruit with 4 longitudinal wings ..... 54. ICHTHYOMETHIA.
      - Fruit not winged.
        - Fruit compressed ..... 55. LONCHOCARPUS.
        - Fruit torulose, not compressed ..... 56. MUELLERA.

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1. TOUNATEA Aubl. Pl. Guian. 1: 549. 1775.

Unarmed trees; leaves unifoliolate or 3 or 5-foliolate; flowers large, racemose; fruit coriaceous or fleshy, dehiscent or indehiscent.

Leaves unifoliolate.....1. T. simplex.
Leaves 3 or 5-foliolate.....2. T. myrtifolia.

1. **Tounatea simplex** (Swartz) Taub. Bot. Centralbl. 47: 391. 1891.
Possira simplex Swartz, Prodr. Veg. Ind. Occ. 82. 1788.
Rittera grandiflora Vahl, Eclog. Amer. 2: 37. *pl. 9.* 1798.
Swartzia grandiflora Willd. Sp. Pl. 2: 1220. 1800.
Swartzia simplex Spreng. Syst. Veg. 2: 567. 1825.

Tepic to Oaxaca. Central America, West Indies, and northern South America.

Glabrous tree, 3.5 to 5 meters high, resembling an orange tree; leaves oval or elliptic, 6 to 20 cm. long, acuminate, thick, lustrous; flowers large (the petal 3.5 cm. long), yellow; fruit 2.5 to 4.5 cm. long, rounded, long-stalked, with thick valves, containing one or two seeds. "Naranjillo" (Michoacán, Guerrero); "naranjito" (Oaxaca).

2. **Tounatea myrtifolia** (J. E. Smith) Taub. Bot. Centralbl. 47: 392. 1891.
Swartzia myrtifolia J. E. Smith in Rees, Cycl. 341. 1820.

Reported by Hemsley from Tabasco. Guatemala to Panama and northern South America; type from Venezuela.

2. ATELEIA Moc. & Sessé; DC. Mém. Légum. 394. *pl. 57.* 1825.

REFERENCE: Standley, The Mexican species of *Ateleia*, Contr. U. S. Nat. Herb. 20: 173–175. 1919.

Unarmed shrubs or trees; leaves pinnate, the leaflets large; flowers of medium size, white, racemose; fruit flat, stipitate, short and broad, indehiscent, more or less winged along the upper suture.

Wing of the fruit obsolete or nearly so; leaflets 1 to 1.6 cm. wide.....1. A. arsenii.
Wing of the fruit well developed; leaflets 2.5 to 5.5 cm. wide.
Seeds 8 mm. long.....2. A. insularis.
Seeds 5 mm. long.....3. A. pterocarpa.

1. **Ateleia arsenii** Standl. Contr. U. S. Nat. Herb. 20: 174. 1919.

Known only from the type locality, Pico de Quinceo, near Morelia, Michoacán, altitude 2,800 meters.

Shrub; leaflets about 17, oblong, 2 to 5 cm. long, obtuse, puberulent beneath; petals about 1.3 cm. long; fruit 2.7 cm. long, 1.6 cm. wide.

2. **Ateleia insularis** Standl. Contr. U. S. Nat. Herb. 20: 175. 1919.

Known only from the type locality, María Madre Island, Tepic.

Leaflets ovate or oblong-ovate, 4.5 to 7 cm. long, obtuse, glabrate in age; fruit 3 cm. long and 2 cm. wide.

3. **Ateleia pterocarpa** DC. Prodr. 2: 419. 1825.
Pterocarpus ateleia Moc. & Sessé; DC. Prodr. 2: 419, 1825, as synonym.

Tepic; type from some unknown locality in Mexico.

Tree, about 6 meters high; leaflets oval or suborbicular, 3.5 to 8 cm. long, puberulent beneath, the venation finely reticulate; fruit 2 cm. long, 1.3 cm. wide.

3. TOLUIFERA L. Sp. Pl. 384. 1753.

1. **Toluifera pereirae** (Klotzsch) Baill. Hist. Pl. 2: 383. 1870.
Myroxylon pereirae Klotzsch, Bonplandia 1857: 274. 1857.

Veracruz and Oaxaca to Yucatán and Chiapas; reported from Michoacán. Central America and northern South America.

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Unarmed tree, sometimes 17 meters high, with gray bark; leaves pinnate, the leaflets 7 to 11, ovate or oval, 3 to 7.5 cm. long, obtuse to acuminate, lustrous, coriaceous at maturity, with numerous translucent dots and lines; flowers whitish, racemose; fruit about 7 cm. long, 2 to 3 cm. wide, indehiscent, the apex thick and 1-seeded, the basal portion long and broadly winged. "Nabá" (Yucatán, Tabasco, Maya); "chucte" (Veracruz); "bálsamo," "árbol de bálsamo," "palo de bálsamo" (Veracruz, Chiapas, Guatemala, etc.); "bálsamo de Perú," "semillas del obispo," "cedro chino" (Oaxaca); "yaga-guienite" (Oaxaca, Zapotec, *Reko*); "hoitziloxítl" (Nahuatl); "bálsamo negro"; "bálsamo de San Salvador."

This tree furnishes the balsam of Peru or "balsamum Peruvianum" of commerce. The commercial article comes chiefly, if not wholly, from El Salvador. The balsam, which is obtained from the trunk of the tree, is a viscid, dark reddish brown, fragrant liquid, with a warm, somewhat bitter taste; it burns readily. It is an official drug of the United States Pharmacopoeia, having stomachic and expectorant properties. It has been employed for chronic catarrh, asthma, phthisis, etc., and for rheumatism and venereal diseases, but at the present time it is little employed by American physicians. The balsam is much used in Europe in the manufacture of perfumery.

In the collection of the balsam, the first step is the beating of a band around the trunk of the tree until the bark is thoroughly crushed, then cuts are made in the bark and fire is applied to the openings, whereupon the sap takes fire, but this is soon extinguished. The tree is then left for 15 days until the balsam begins to run, when it is collected on pieces of cotton thrust into the incisions. The juice is squeezed from these into jars of boiling water, upon which the balsam floats. The trees will produce one to two kilograms per week, but they are tapped only in the spring before the rainy season. The balsam is at first amber-colored but soon turns brown. It is obtained also from the fruit, this kind being of better quality and known as "bálsamo blanco." By a papal bull issued by Pius IV in 1562, and by another by Pius V in 1571, the clergy were authorized to use the "bálsamo negro" in the preparation of the chrism, and it was declared a sacrilege to injure or destroy the trees. The balsam is still widely used for this purpose.

The tree was well known to the early inhabitants of Mexico, by whom it was much used in medicine. It was one of the trees cultivated in the royal garden of Mexico, having been brought from the *tierra caliente*. Jars of the balsam were a regular article of tribute to the emperor. The balsam attracted the attention of the early Spanish explorers and was forwarded by them to Europe. Here the most extravagant properties were ascribed to it, and it sold at prices ranging from twenty to two hundred dollars an ounce. In early days much of the balsam is said to have reached Spain by way of Peruvian ports, hence the derivation of the misleading name of "balsam of Peru." An infusion of the fruit in alcoholic liquors is employed locally as a stimulant, diuretic, and anthelmintic, and as a lotion to remove freckles.

The tree is described and figured by Hernández[1] in a chapter entitled "De *Hoitziloxitl*, seu Arbore Balsami Indici." He states that the Panucans called the tree "chucte." An inferior kind of balsam, he states, was obtained by boiling the twigs in water.

4. SWEETIA Spreng. Syst. Veg. 2: 171. 1825.

1. **Sweetia panamensis** Benth. Journ. Linn. Soc. Bot. 8: 263. 1865.
Michoacán and Guerrero. Costa Rica and Panama (type locality).

[1] Thesaurus 51. 1651.

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Tree, 8 to 12 meters high, unarmed; leaves pinnate, the leaflets ovate, 5 to 7.5 cm. long, coriaceous, obtuse or acutish, bright green and lustrous above; flowers white, 6 mm. long, racemose-paniculate; fruit flat, oblong or elliptic, 5.5 to 9 cm. long, 2 cm. wide, thin, with one or two seeds. "Huesillo" (Michoacán, Guerrero).

5. SOPHORA L. Sp. Pl. 373. 1753.

Trees or shrubs, unarmed; leaves pinnate, the leaflets large, thick; flowers racemose; fruit linear, terete or slightly compressed, constricted between the seeds, indehiscent or tardily dehiscent.

One herbaceous species, *S. sericea* Nutt., occurs in northern Mexico.

Leaflets 0.6 to 1 cm. long ..... 1. S. purpusi.
Leaflets 2 to 5 cm. long or longer.
  Leaflets not reticulate-veined; racemes usually 20 cm. long or longer. 2. S. tomentosa.
  Leaflets conspicuously reticulate-veined; racemes usually less than 10 cm. long.
    Calyx conspicuously dentate; leaflets mostly oblong or elliptic-oblong, sericeous beneath, at least when young ..... 3. S. secundiflora.
    Calyx subtruncate; leaflets oval or broadly oval, glabrous ..... 4. S. conzattii.

1. Sophora purpusi T. S. Brandeg. Zoe 5: 235. 1906.

Coahuila and Zacatecas; type from Sierra de Parrás, Coahuila.

Shrub; leaflets about 17, oval or oblong, coriaceous, green and glabrate on the upper surface, sericeous beneath; racemes few-flowered, the flowers white, tinged or dotted with purple; fruit white-sericeous, 2 or 3-seeded.

2. Sophora tomentosa L. Sp. Pl. 373. 1753.

Known in Mexico only from Clarion Island, Baja California. Widely distributed on seashores in the tropics of both hemispheres.

Shrub, 1 to 3 meters high, leaves deciduous, the leaflets 15 to 21, oblong to orbicular, 2 to 4 cm. long, sericeous beneath, at least when young; flowers yellowish white, 2.5 cm. long; pods long and slender, strongly constricted between the seeds; seeds brown. "Tambalisa" (Cuba).

The plant is reputed to have diuretic, sudorific, and purgative properties, and is used in the West Indies as a remedy for venereal diseases. The seeds are commonly believed to be poisonous, and they, like other parts of the plant, contain a poisonous alkaloid. It is said, however, that in Madagascar the pods are fed to cattle.

3. Sophora secundiflora (Ortega) Lag.; DC. Cat. Hort. Monsp. 148. 1813.

Broussonetia secundiflora Ortega, Hort. Matr. Dec. 61. *pl.* 7. 1798.

Virgilia secundiflora Cav. Icon. Pl. 5: *pl. 401.* 1799.

Coahuila to San Luis Potosí. Western Texas and southern New Mexico.

Shrub or small tree, sometimes 12 meters high, with a trunk 20 cm. in diameter; leaves evergreen, the leaflets 7 to 11, 2.5 to 6 cm. long, lustrous on the upper surface, beneath sericeous, at least when young; flowers 2 to 3 cm. long, violet-blue, very fragrant; fruit hard and woody, sometimes 20 cm. long; seeds large, bright red; wood hard, close-grained, orange-red, with yellow sapwood, its specific gravity about 0.98. "Frijolillo" (Nuevo León, Texas); "colorín" (Coahuila, Nuevo León, Texas); "frijolito" (Texas).

The seeds contain a bitter poisonous alkaloid, sophorine, and one seed is said to be sufficient to cause death in a human being. The Indians of Texas and adjacent Mexico used small quantities of the powdered seeds to produce a sort of intoxication. Taken thus the seeds produce general excitement, delirium, and finally deep sleep lasting two or three days. Children have been poisoned fatally by eating the seeds. The wood is said to yield a yellow dye.

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4. Sophora conzattii Standl., sp. nov.

Type from Cerro Espino, Distrito de Pochutla, Oaxaca, altitude 1,200 meters (*Conzattii, Reko & Makrinius* 3171; U. S. Nat. Herb. no. 763856).

Tree, the young branchlets puberulent; leaves persistent, the rachis 9.5 to 13 cm. long, puberulent at first but soon glabrate, the petiolules 2 mm. long; leaflets 7 or 9, oval or elliptic-oval, 3.5 to 5.5 cm. long, 2.2 to 3.5 cm. wide, rounded at base, rounded or very obtuse at apex, coriaceous, bright green, lustrous, glabrous, the venation prominent and reticulate on both surfaces; racemes about 5.5 cm. long, few-flowered, the rachis and pedicels minutely sericeous, the pedicels 6 to 8 mm. long, the flowers violet; calyx 6 mm. long and 8 mm. broad, minutely sericeous, the limb oblique, truncate or subundulate; petals glabrous, the standard 2.8 cm. long its claw 4 to 5 mm. long, the blades of the other petals about 18 mm. long; stamens glabrous; ovary densely sericeous. "Frijolillo."

6. ORMOSIA Jack, Trans. Linn. Soc. Bot. 10: 360. 1825.

1. Ormosia mexicana Standl., sp. nov.

Type from Zacuapan, Veracruz (*Purpus* 6326; U. S. Nat. Herb. no. 566950).

Leaves large, brown-tomentose, finally glabrate, the petiolules stout, 7 mm. long; leaflets 13, oblong, oblanceolate-oblong, or ovate, 8 to 17 cm. long, 4.5 to 5.5 cm. wide, obtuse or rounded at the more or less unequal base, obtuse or acutish at apex, thin, green and glabrate on the upper surface, minutely pilose beneath with yellow hairs; racemes 10 to 17 cm. long, paniculate, the branches densely brown-tomentulose, the bracts and bractlets linear or lanceolate, 7 mm. long or shorter, subpersistent; calyx 1 cm. long, brown-tomentulose, the lobes about as long as the tube, lance-oblong, acute or acuminate; petals tomentulose outside, the standard short-clawed, 13 mm. long, 10 mm. wide; ovary densely brown-pilose, 3 or 4-ovulate.

No species of this genus has been reported previously from Mexico, and only two are recorded from Central America, both from Panama. *O. mexicana* is clearly district from the Panaman species. It resembles somewhat *Dussia martinicensis* Krug & Urban, of the Lesser Antilles, but the leaflets are so different that it may scarcely be referred to that species. The flowers, too, are smaller than in the Martinique plant.

7. XYLOTHERMIA Greene, Pittonia 2: 188. 1891.

1. Xylothermia montana (Nutt.) Greene, Pittonia 2: 188. 1891.

Pickeringia montana Nutt.; Torr. & Gray, Fl. N. Amer. 1: 389. 1840.

Xylothermia montana tomentosa Abrams, Bull. Torrey Club 34: 263. 1907.

California, the type from Santa Barbara; probably extending to northern Baja California.

Erect shrub with spinose branches; leaves sessile, digitately trifoliolate or unifoliolate, the leaflets elliptic or obovate, 1 to 2 cm. long; flowers reddish purple, nearly 2 cm. long, in short racemes; fruit linear, flat.

8. CROTALARIA L. Sp. Pl. 714. 1753.

Low erect shrubs, unarmed; leaves digitately trifoliolate or sometimes simple; flowers usually yellow, racemose; fruit short, inflated, bivalvate.

A number of herbaceous species occur in Mexico. Those listed here are more properly herbs than shrubs, but they are frequently suffrutescent. The seeds rattle about in the inflated fruit, giving the effect of a rattlebox, hence the generic name. The plants of the genus are of little economic importance, although some are of value for forage. Some species are cultivated in India for their fiber, which is of good quality.

Leaves simple.....1. C. schiedeana.

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Leaves trifoliolate.
  Leaflets densely pilose-sericeous on the upper surface.
    Corolla copiously pilose ..... 2. C. gloriosa.
    Corolla glabrous ..... 3. C. mollicula.
  Leaflets glabrous or nearly so on the upper surface.
    Pubescence of the fruit spreading.
      Keel of the corolla about 8 mm. long ..... 4. C. setifera.
      Keel 12 to 15 mm. long ..... 5. C. eriocarpa.
    Pubescence of the fruit closely appressed.
      Keel of the corolla with a long slender beak ..... 6. C. longirostrata.
      Keel with a short stout beak.
        Racemes mostly borne opposite the leaves ..... 7. C. vitellina.
        Racemes mostly terminal.
          Leaflets lanceolate to linear-oblong ..... 8. C. maypurensis.
          Leaflets mostly ovate or elliptic ..... 9. C. anargyroides.

1. **Crotalaria schiedeana** Steud. Nom. Bot. 1: 445. 1840.
Crotalaria bracteata Cham. Linnaea 5: 575. 1830. Not *C. bracteata* Roxb. 1814.
Veracruz and Oaxaca; type from Zacuapan, Veracruz.
Low shrub or, as in most of the other species of the genus, chiefly or wholly herbaceous; leaves linear-oblong. 5 to 7 cm. long, subsessile, obtuse, sericeous; flowers 2 cm. long; fruit about 3 cm. long.

2. **Crotalaria gloriosa** Rose, Contr. U. S. Nat. Herb. 12: 273. 1909.
Known only from the type locality, mountains near Iguala, Guerrero.
Shrub, about 2 meters high, densely pilose; leaflets 4 to 6 cm. long, acute; corolla 1.5 cm. long; fruit densely sericeous.

3. **Crotalaria mollicula** H. B. K. Nov. Gen. & Sp. 6: 403. 1823.
Type from the vicinity of Guanajuato; reported also from Oaxaca.
Leaflets lanceolate, obtuse, 1.5 to 2 cm. long.

4. **Crotalaria setifera** DC. Prodr. 2: 131. 1825.
Jalisco to San Luis Potosí, Morelos, and Oaxaca.
Slender shrub, often a meter high; leaflets linear-oblong to elliptic, 1.5 to 4.5 cm. long, acute or obtuse; flowers 1.5 cm. long; fruit 1.5 to 2 cm. long.

5. **Crotalaria eriocarpa** Benth. Bot. Voy. Sulph. 80. 1844.
Crotalaria viminalis Rose, Contr. U. S. Nat. Herb. 8: 47. *pl. 6.* 1903.
Sinaloa to Morelos; type from Mazatlán, Sinaloa.
Shrub, 1.5 to 3 meters high, sometimes with long pendent branches; leaflets mostly elliptic, 2 to 5 cm. long, acute or obtuse; flowers yellow, 2.5 cm. long, in long racemes; fruit 2 to 3 cm. long. "Tronador," "cascabelito" (Sinaloa).

6. **Crotalaria longirostrata** Hook. & Arn. Bot. Beechey Voy. 285. 1836–39.
Jalisco (type locality) and Tepic to Chiapas. Guatemala and Nicaragua.
Slender shrub, about a meter high; leaflets oblong to elliptic-oval, 1 to 4.5 cm. long, obtuse or rounded at apex; flowers yellow, 1.5 to 2 cm. long. "Chapilín" or "chipilín" (Guatemala).
The young branches are used in Guatemala as a pot herb.

7. **Crotalaria vitellina** Ker, Bot. Reg. 6: *pl.* 447. 1820.
Sinaloa and Jalisco to Veracruz, Tabasco, and Chiapas. Central America and South America; type from Brazil.
Slender shrub, about a meter high; leaflets lanceolate to elliptic-oval, 2 to 8 cm. long, acute or obtuse; flowers 2 cm. long, yellow; fruit 2 to 3.5 cm. long. "Chipilín cimarrón" (Tabasco); "tronador" (Sinaloa); "cohetillo" (El Sal-

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vador); "chipilín" (Guatemala); "quiebra-plato," "uña del diablo" (Costa Rica).

Said to be of some importance as a forage plant in Brazil.

8. **Crotalaria maypurensis** H. B. K. Nov. Gen. & Sp. 6: 403. 1823.

Crotalaria acapulcensis Hook. & Arn. Bot. Beechey Voy. 414. 1841.

Jalisco to Veracruz and Chiapas. Central America and South America.

Slender shrub, 1 to 1.5 meters high; leaflets 2.5 to 6 cm. long, obtuse or acute; flowers yellow, 1.5 to 2 cm. long; fruit about 3 cm. long.

9. **Crotalaria anargyroides** H. B. K. Nov. Gen. & Sp. 6: 404. 1823.

Veracruz to Michoacán and Guerrero. Central America and northern South America.

Leaflets 1 to 5 cm. long, obtuse or rounded at apex; flowers yellow, 1.5 cm. long.

C. cajanifolia H. B. K.,[1] described from the Volcán de Jorullo, is perhaps the same species.

9. INDIGOFERA L. Sp. Pl. 751. 1753.

Unarmed shrubs or sometimes herbs, the pubescence of appressed hairs, these attached by the middle; leaves pinnate; flowers small, in axillary racemes; fruit terete or compressed, small.

Fruit strongly compressed, 3.5 to 5 mm. wide ..... 1. I. platycarpa.
Fruit terete or tetragonous, usually narrower.
  Leaflets oblanceolate or obovate, broadest above the middle; leaves sessile or nearly so.
    Leaflets conspicuously punctate ..... 2. I. sabulicola.
    Leaflets not punctate.
      Plants prostrate or procumbent; leaflets usually less than 1.5 cm. long. 3. I. ornithopodioides.
      Plants erect; leaflets mostly 1.7 to 3 cm. long ..... 4. I. lespedezioides.
  Leaflets lanceolate to oval, broadest at or below the middle; leaves petiolate.
    Fruit 1 to 3-seeded, 5 to 9 mm. long.
      Leaflets glabrous on the upper surface.
        Fruit subglobose, 1-seeded ..... 5. I. sphaerocarpa.
        Fruit oblong, usually 2 or 3-seeded ..... 6. I. densiflora.
      Leaflets strigose on the upper surface.
        Fruit truncate or subtruncate at apex ..... 7. I. sphinctosperma.
        Fruit rounded to acute at apex.
          Fruit 1-seeded, subglobose ..... 8. I. jaliscensis.
          Fruit 2 or 3-seeded, oblong.
            Leaflets usually 15 or more ..... 9. I. montana.
            Leaflets 3 to 7 ..... 10. I. tumidula.
    Fruit with several seeds, usually much more than 1 cm. long.
      Lobes of the calyx subulate, twice as long as the tube or longer; leaflets usually 3 or 5 ..... 11. I. mucronata.
      Lobes of the calyx deltoid or lanceolate, little if at all longer than the tube; leaflets 7 or more
        Fruit conspiciously curved ..... 12. I. suffruticosa.
        Fruit straight or nearly so.
          Leaflets glabrous on the upper surface ..... 13. I. salmoniflora.
          Leaflets strigose on the upper surface.
            Corolla 5 to 6 mm. long.

[1] Nov. Gen. & Sp. 6: 405. 1823.

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Leaflets mostly 2 to 4 cm. long, green, sparsely strigose.
14. I. cuernavacana.
Leaflets mostly less than 1.5 cm. long, densely gray-strigose.
15. I. conzattii.
Corolla 7 to 10 mm. long.
Racemes 4 cm. long or shorter, few-flowered____16. I. palmeri.
Racemes 5 to 20 cm. long, many-flowered.
Leaflets 3 to 5 pairs; fruit 2.5 to 4 cm. long__17. I. fruticosa.
Leaflets 6 to 10 pairs; fruit 1.5 to 2.5 cm. long.
18. I. thibaudiana.

1. **Indigofera platycarpa** Rose, Contr. U. S. Nat. Herb. **8**: 47. *pl.* 7. 1903.

Guerrero and Morelos; type from limestone mountains near Iguala, Guerrero.

Erect shrub, 1.5 to 4.5 meters high, with reddish brown branches; leaflets oval or oblong, 1 to 1.5 cm. long, obtuse; fruit 2 to 3 cm. long, 3 to 4 mm. wide.

2. **Indigofera sabulicola** Benth. in Mart. Fl. Bras. **15**[1]: 40. 1859.

Guerrero, Oaxaca, and Veracruz. Central America, West Indies, and South America; type from Brazil.

Plants prostrate, fruticose or almost wholly herbaceous, densely sericeous; leaflets about 5 mm. long; flowers 7 mm. long.

3. **Indigofera ornithopodioides** Schlecht. & Cham. Linnaea **5**: 577. 1830.

Indigofera leptosepala Nutt.; Torr. & Gray, Fl. N. Amer. **1**: 298. 1838.

Indigofera acutifolia Schlecht. Linnaea **12**: 282. 1838.

Indigofera mexicana Benth. Pl. Hartw. 286. 1848.

Chihuahua to Tamaulipas and Oaxaca; type from Veracruz. Texas.

Plants prostrate or procumbent, chiefly herbaceous but sometimes shrubby; leaflets usually 5 or 7, rounded or retuse at apex; flowers 5 to 6 mm. long.

It is possible that the Mexican material includes more than one species, but there are no apparent lines of division. The description of *I. hippocrepoides* Schlecht.[1] suggests this species, but that plant may belong to some other genus. The same is true of *I. coronilloides* Mart. & Gal.[2]

4. **Indigofera lespedezioides** H. B. K. Nov. Gen. & Sp. **6**: 457. 1823.

Michoacán to Oaxaca; reported, probably erroneously, from Chihuahua; type from Volcán de Jorullo. Central America, Cuba and Jamaica, and South America.

Shrub or herb, a meter high or less; leaflets 3 or 5 or often only 1, rounded or retuse at apex; flowers red or purplish, 6 to 7 mm. long. "Añil cimarrón" (Cuba); "cachecahua," "escorzonera de jiquilite" (Guatemala, Honduras, *Blake*).

Said to be of some value as a forage plant in Cuba. Used in Guatemala as a remedy for stomach troubles.

5. **Indigofera sphaerocarpa** A. Gray, Pl. Wright. **2**: 37. 1853.

Northern Chihuahua and Sonora; type from Santa Cruz, Sonora. Southern Arizona.

Slender erect shrub; leaflets about 17, 1 to 1.5 cm. long; flowers 3 mm. long; fruit 3 to 4 mm. long.

6. **Indigofera densiflora** Mart. & Gal. Bull. Acad. Brux. **10**[2]: 44. 1843.

Mexico. Morelos, Puebla, and Oaxaca (type locality).

Slender shrub, about 2 meters high; leaflets about 19, oblong to oval, 1.5 to 2 cm. long; fruit about 8 mm. long.

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[1] Linnaea **12**: 283. 1838.

[2] Bull. Acad. Brux. **10**[2]: 45. 1843.

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A specimen from Durango is very closely related, differing only in having the leaflets thinly strigose on the upper surface.

7. **Indigofera sphinctosperma** Standl. Contr. U. S. Nat. Herb. **20**: 216. 1919.

Veracruz; type from Zacuapan.

Slender shrub; leaflets about 17, oval or rounded-oval, 8 to 14 mm. long; fruit 3 to 4 mm. long.

8. **Indigofera jaliscensis** Rose, Contr. U. S. Nat. Herb. **8**: 310. 1905.

Jalisco to Morelos; type from Río Blanco, Jalisco.

Shrub, a meter high or less; leaflets about 25, oblong or oval-oblong, 1 to 2.5 cm. long.

9. **Indigofera montana** Rose, Contr. U. S. Nat. Herb. **8**: 311. 1905.

Durango, Zacatecas, and Jalisco; type collected between Mezquite and Monte Escobedo, Jalisco.

Slender shrub, about a meter high; leaflets oblong or narrowly oblong, 1 to 2.5 cm. long; flowers brown-sericeous.

Closely related to the preceding species, but usually with narrower leaflets.

10. **Indigofera tumidula** Rose, Contr. U. S. Nat. Herb. **12**: 273. 1909.

Known only from the type locality, Iguala Canyon, Guerrero.

Shrub; leaflets oblong, 3 to 4 cm. long, rounded at apex; fruit 4 to 5 mm. long.

11. **Indigofera mucronata** Spreng.; DC. Prodr. **2**: 227. 1825.

Galega frutescens Mill. Gard. Dict. ed. 8. *Galega* no. 3. 1768. Not *Indigofera frutescens* L. f. 1781.

Indigofera torulosa Hook. & Arn. Bot. Beechey Voy. 286. 1836–39.

Sinaloa to Veracruz and Chiapas. Widely distributed in tropical regions.

Plants herbaceous or suffrutescent and procumbent, or sometimes shrubby and 2 meters high, sparsely strigose; leaflets oblong to broadly oval, 1 to 3 cm. long, bright green; flowers pinkish or brick-red; fruit 2.5 to 4 cm. long, tetragonous, slender. "Añilillo" (Tabasco, *Rovirosa*).

12. **Indigofera suffruticosa** Mill. Gard. Dict. ed. 8. *Indigofera* no. 2. 1768.

Indigofera anil L. Mant. Pl. **2**: 272. 1771.

Indigofera lindheimeriana Scheele, Linnaea **21**: 464. 1848.

Occurring nearly throughout Mexico. Widely dispersed in tropical America, and adventive in the Old World.

Shrub, 1 to 2.5 meters high; leaflets mostly 11 or 13, oblong or oval, 1 to 3 cm. long; flowers small, greenish or yellowish; fruit 1.2 to 1.5 cm. long, falcate. Known generally in Spanish America as "añil"; "choh" (Yucatán, Maya); "jiquelite" or "xiquelite" (Oaxaca, Chiapas, Central America; from the Nahuatl *xiu-quilitl*, "turquoise-herb"); "huiquilitl" (*Ramírez*); "añil colorado" (Tabasco, *Rovirosa*); "añil jiquelite," "añil montés" (Oaxaca); "jiquilete," "jiguilete" (Guatemala); "azul," "azulejo" (Santo Domingo).

This species was formerly widely cultivated in the warmer parts of America for the extraction of indigo, although an Old World species, *I. tinctoria* L., was often used also. The latter is the chief source of the Old World indigo. In the southeastern United States indigo was an important crop in the early part of the nineteenth century. In 1794 about 1,500,000 pounds were exported to Europe. In southern Mexico, also, it was an important article of export, in Yucatán up to 1885 at least. The blue dye, for which indigo is chiefly valued, was finally largely replaced by coal-tar products, although much natural indigo is still used, having been found superior for some purposes to the artificial dyes. One of the chief reasons for the decline of indigo cultivation in America is the fact that the extraction and handling of the dye is very injurious to the health of those engaged in the work. The process of extraction of the coloring

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matter is simple; the dried plants are soaked in water, and the infusion drawn off; the indigo soon settles to the bottom of the liquid and is rolled into balls and dried.

The use of this plant as a dye was known to the aboriginal inhabitants of Mexico. In Sonora the Indians use it for coloring palm leaves and other articles. In addition the plant has been much used in domestic medicine. The Aztecs used the seeds for urinary diseases and for ulcers, the leaves as a poultice applied to the head to reduce fever, and the plant as a remedy for syphilis. Febrifuge, vulnerary, purgative, antispasmodic, diuretic, and stomachic properties have been attributed to the plant, and it is a favorite local remedy for epilepsy. In Brazil it is one of the reputed remedies for snake bites, and in the United States indigo is often applied to the stings of bees and other insects. The powdered seeds or a decoction of the roots are said to be efficient in destroying vermin upon the human body.

13. **Indigofera salmoniflora** Rose, Contr. U. S. Nat. Herb. **5**: 140. 1897.
Sinaloa; type from Imala.
Slender shrub, about a meter high; leaflets usually 7 or 9, oval, 1.5 to 4.5 cm. long; flowers pink; fruit 3 to 4 cm long.

14. **Indigofera cuernavacana** Rose, Contr. U. S. Nat. Herb. **5**: 140. 1897.
Morelos to Michoacán and Oaxaca; type from Cuernavaca, Morelos.
Slender shrub, 2.5 meters high or less; leaflets about 9, oval, 2 to 4 cm. long.

15. **Indigofera conzattii** Rose, Contr. U. S. Nat. Herb. **8**: 310. 1905.
Puebla and Oaxaca; type from Monte Albán, Oaxaca.
Low shrub; leaflets usually 7 or 9; fruit about 2 cm. long.

16. **Indigofera palmeri** S. Wats. Proc. Amer. Acad. **22**: 404. 1887.
Durango and Jalisco; type from Tequila, Jalisco.
Slender shrub, 1.5 to 4.5 meters high; leaflets oblong or oval, 1 to 3 cm. long; fruit 1.5 to 3 cm. long.

17. **Indigofera fruticosa** Rose, Contr. U. S. Nat. Herb. **5**: 140. 1897.
Baja California; type from San José del Cabo.
Shrub, 1 to 1.5 meters high.

18. **Indigofera thibaudiana** DC. Prodr. **2**: 225. 1825.
Indigofera excelsa Mart. & Gal. Bull. Acad. Brux. **10**[2]: 45. 1843.
San Luis Potosí and Veracruz to Oaxaca. Guatemala.
Shrub, 1 to 3 meters high; leaflets oblong to rounded-oval, 1.5 to 4 cm. long. "Añil silvestre."
I. costaricensis Benth. has been treated as a synonym of this species, but it seems to differ in the glabrous upper surface of the leaflets.

DOUBTFUL SPECIES.

INDIGOFERA LOTOIDES Schlecht. Linnaea **12**: 282. 1838. Type from Mineral del Monte. Apparently not of this genus.

INDIGOFERA PURPUSII T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 499. 1919. Type from Barranca de Tenampa, Veracruz.

10. APOPLANESIA Presl, Symb. Bot. 1: 63. *pl. 41.* 1831.

1. **Apoplanesia paniculata** Presl, Symb. Bot. **1**: 63. *pl. 41.* 1831.
Microlobium glandulosum Liebm. Nat. For. Kjöbenhavn Vid. Medd. **1853**: 104. 1854.
Eyscnhardtia olivana Safford, Journ. Washington Acad. Sci **6**: 133. *f. 1.* 1916.
Colima to Oaxaca. Guatemala.

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Tree, sometimes 10 meters high; leaves odd-pinnate, the leaflets oval or oblong, 1 to 7 cm. long, rounded or emarginate at apex, black-dotted, puberulent when young but soon glabrate; flowers small, in slender racemes, the calyx accrescent in fruit. "Palo de arco" (Guerrero, Oaxaca); "ébano," "cacanaquasle" (Colima); "arco negro," "matagallina," "palo matagallina," "palo de arco negro," "palo de arco" (Oxaca); "guie-biche" (Oaxaca, Zapotec, *Reko*); "cacanaguaste" (Colima).

The bark is said to yield a dye.

11. AMORPHA L. Sp. Pl. 713. 1753.

Erect unarmed shrubs; leaves pinnate, the leaflets numerous, gland-dotted; flowers small, violet, racemose, the corolla of a single petal; fruit short, 1 or 2-seeded, indehiscent.

Calyx lobes very short, obtuse; rachis of the leaf not aculeolate. **1. A. fragrans.**

Calyx lobes elongate, acute; rachis of the leaf finely glandular-aculeolate. **2. A. californica.**

1. Amorpha fragrans Sweet, Brit. Fl. Gard. *pl. 241.* 1828.

Amorpha occidentalis Abrams, Bull. N. Y. Bot. Gard. **6:** 394. 1910.

Northern Chihuahua and Sonora. California to Texas, Illinois, and Montana.

Shrub, 1 to 3 meters high; leaflets 9 to 27, oblong to oval, 1.5 to 4 cm. long, minutely strigose; racemes 8 to 20 cm. long; calyx gland-dotted, 3 to 3.5 mm. long; banner 4.5 to 5 mm. long; fruit 5 mm. long.

From some of the related species, known in the United States as "false indigo," a kind of indigo was formerly extracted.

2. Amorpha californica Nutt.; Torr. & Gray, Fl. N. Amer. **1:** 306. 1838.

Mountains of Baja California. Southern Arizona and California (type from Santa Barbara).

Shrub 1 to 3 meters high; leaflets 11 to 25, oval or elliptic, 1 to 3 cm. long, soft-pilose, rounded at apex; racemes 5 to 20 cm. long; calyx 5 to 6 mm. long; banner 5 mm. long; fruit curved, 5 mm. long.

DOUBTFUL SPECIES.

AMORPHA RABIAE Lex.; Llave & Lex. Nov. Veg. Descr. **1:** 22. 1824. Described from Pico de Quinceo, near Morelia, Michoacán. Probably not of this genus.

12. EYSENHARDTIA H. B. K. Nov. Gen. & Sp. **6:** 489. 1824.

REFERENCE: Pennell, N. Amer. Fl. **24:** 34–40. 1919.

Shrubs or small trees; leaves pinnate, the leaflets glandular-punctate; flowers in lax spikelike racemes; corolla nearly regular, white; stamens 10; fruit indehiscent, 1-seeded.

Calyx irregular, in fruit flaring from the base, the slit between the posterior lobes extending nearly to the base, the anterior lobes decidedly longer than the posterior ones.

Leaflets 35 to 45, 8 to 12 mm. long; bracts deciduous before anthesis; fruit 14 to 16 mm. long, glabrous ..... **1. E. punctata.**

Leaflets 9 to 25, 3 to 6 mm. long; bracts persistent until after anthesis; fruit 5 to 7 mm. long, pubescent.

Leaflets 21 to 25, densely pubescent on the upper surface; racemes 6 to 9 cm. long ..... **2. E. schizocalyx.**

Leaflets 9 to 17, nearly glabrous on the upper surface; racemes 1 to 5 cm. long.

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Leaflets 9 or 11, 4 to 5 mm. long; style with a minute gland. 3. E. peninsularis.

Leaflets 13 to 17, 3 to 4 mm. long; style glandless 4. E. spinosa.

Calyx only slightly irregular, in fruit tubular-campanulate, the slit between the posterior lobes short, the anterior lobes only slightly longer than the posterior ones.

Style pubescent, glandless; fruit 5 to 8 mm. long; leaflets 9 to 13, 2 to 2.5 mm. long 5. E. parvifolia.

Style glabrous, gland-bearing; fruit 7 to 20 mm. long; leaflets 21 to 51, 3 to 25 mm. long.

Fruit reflexed in age, punctate with inconspicuous glands; standard conspicuously notched 6. E. polystachya.

Fruit ascending, punctate with conspicuous glands; standard petal only slightly notched.

Fruit 12 to 13 mm. long, 3.5 to 4 mm. wide, straight or nearly so; leaflets 41 to 49, 12 to 15 mm. long 7. E. platycarpa.

Fruit 7 to 10 mm. long, 2 to 2.5 mm. wide, curved; leaflets 15 to 31, 5 to 11 mm. long 8. E. texana.

1. **Eysenhardtia punctata** Pennell, N. Amer. Fl. **24**: 39. 1920.

Aguascalientes and Jalisco; type collected between Bolaños and Guadalajara, Jalisco.

Shrub or small tree, 3 to 5 meters high, with fragrant foliage; leaflets oval-oblong, glabrate; racemes 4 to 9 cm. long; calyx 3 to 4 mm. long; fruit 4.5 to 5 mm. wide, straight. "Palo dulce" (Aguascalientes).

2. **Eysenhardtia schizocalyx** Pennell, N. Amer. Fl. **24**: 39. 1920.

Known only from the type locality, Mapimi, Durango.

Branchlets cinereous-canescent; leaflets oval or broadly oblong, 4 to 6 mm. long, appressed-pubescent; petals 4 to 4.5 mm. long; fruit 2.5 to 3 mm. wide.

3. **Eysenhardtia peninsularis** T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 180. 1911.

Baja California.

Densely branched shrub, the branchlets cinereous-canescent; leaflets oblong, puberulent beneath; racemes 2 to 5 cm. long; petals 4 to 5 mm. long.

4. **Eysenhardtia spinosa** Engelm.; A. Gray, Bost. Journ. Nat. Hist. **6**: 174. 1850.

Chihuahua; type from Lake Encinillas.

Densely branched shrub, the branchlets cinereous-canescent; leaflets oblong or oval, puberulent beneath; racemes 1 to 3 cm. long; petals 4 to 4.5 mm. long; fruit 2 mm. wide.

5. **Eysenhardtia parvifolia** T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 180. 1911.

Known only from the type locality, Sierra de Parrás, Coahuila.

Densely branched shrub, the branchlets canescent; leaflets elliptic-oval, glabrate; racemes 5 to 10 mm. long; fruit 1.7 to 2 mm. wide, glabrous.

6. **Eysenhardtia polystachya** (Ortega) Sarg. Silv. N. Amer. **3**: 29. 1892.

Viborquia polystacha Ortega, Hort. Matr. Dec. 66. 1798.

Eysenhardtia amorphoides H. B. K. Nov. Gen. & Sp. **6**: 491. 1824.

Varennea polystachya DC. Prodr. **2**: 522. 1825.

Eysenhardtia amorphoides orthocarpa A. Gray, Pl. Wright. **2**: 37. 1853.

Eysenhardtia orthocarpa S. Wats. Proc. Amer. Acad. **17**: 339. 1882.

? *Psoralea stipularis* Sessé & Moc. Fl. Mex. ed. 2. 169. 1894.

Eysenhardtia reticulata Pennell, N. Amer. Fl. **24**: 36. 1919.

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Eysenhardtia subcoriacea Pennell, N. Amer. Fl. **24**: 36. 1919.

Eysenhardtia cobriformis Pennell, N. Amer. Fl. **24**: 36. 1919.

Chihuahua and Sonora to Oaxaca and Tamaulipas. Southern Arizona.

Shrub or tree, 3 to 8 meters high, the branchlets canescent; bark thin, light gray; leaflets 21 to 51, oblong or oval, 3 to 20 mm. long, pubescent or sometimes glabrate; racemes 4 to 15 cm. long; petals 5 to 7 mm. long; fruit 10 to 15 mm. long, 3 to 5 mm. wide, glabrous; wood hard, dense, reddish brown, the specific gravity about 0.87. "Rosilla," "palo cuate" (Sinaloa); "palo dulce" (Mexico, Hidalgo, Puebla, Sonora, Jalisco, Oaxaca); "coatl," "coate," "cuate" (from the Nahuatl *coatli*, "snake-water"); "palo dulce blanco" (Mexico); "taray" (Nuevo León, Durango); "vara dulce," "varaduz" (Durango, *Patoni*); "leña nefrítica"; "urza" (Otomí).

This plant has long been known in Mexico because of the peculiar properties of the wood.[1] An infusion of the heartwood in water has at first a golden-yellow color which soons deepens to orange. When held in a glass vial against a black background it exhibits a beautiful peacock-blue fluorescence. The wood was well known in Europe as early as the 16th century, where it was called "lignum nephriticum," because of its supposed duretic properties. It was first mentioned by Monardes (1565), and is mentioned by Hernández under the name "coatl" or "coatli." He also states that the name "tlapalezpatli,"[2] or "blood-red medicine," was used for the plant. Sahagún writes of the plant as follows: "There is a wild tree called *coatli* from which they get the branches for making the baskets which they call *uacales*. It is a flexible wood, and if put in water the latter becomes blue. It is a remedy for urinary diseases."

The foliage of the tree is aromatic and the flowers are fragrant. In Mexico drinking troughs made from the wood are used for watering fowls, or a piece of the wood is put in their drinking water to ward off diseases. Palmer reports that in Sonora a decoction of the wood is given as a refreshing drink to fever patients. The wood is much used in some localities for kidney and bladder affections. It also gives a yellowish brown dye.

7. **Eysenhardtia platycarpa** Pennell & Safford, N. Amer. Fl. **24**: 37. 1919.

Jalisco to Puebla and Guerrero; type from Barranca of Guadalajara, Jalisco.

Shrub or small tree, 3 to 5 meters high, the branchlets cinereous-puberulent; leaflets oblong, minutely puberulent; racemes 4 to 12 cm. long; petals 5 mm. long; fruit glabrous.

8. **Eysenhardtia texana** Scheele, Linnaea **21**: 462. 1848.

Coahuila and Tamaulipas. Texas; type from New Braunfels.

Shrub, 2 to 3.5 meters high; leaflets oblong, finely puberulent; racemes 3 to 10 cm. long; petals 4 to 5 mm. long; fruit glabrous. "Vara dulce" (Tamaulipas).

The shrub is said to be a good honey plant.

13. PAROSELA Cav. Descr. Pl. 185. 1802.

REFERENCE: Rydberg, N. Amer. Fl. **24**: 40–116. 1919–20.

Shrubs or rarely small trees, with gland-dotted branches, leaves, and calyx; leaves pinnate, rarely simple; flowers racemose or spicate; calyx 10-ribbed,

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[1] See W. E. Safford, *Lignum nephriticum*—its history and an account of the remarkable fluorescence of its infusion, Smiths. Rep. 1915: 271–298. *pl. 1–7.* 1916; also Safford, *Eysenhardtia polystachya*, the source of the true *Lignum nephriticum mexicanum*, Journ. Washington Acad. Sci. 5: 503–517. *f. 1, 2.* 1915.

[2] Also written "tlalpalezpatli" and "tlapahoaxpatli."

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5-lobed; stamens 10 or 9; fruit indehiscent, 1 or few-seeded, usually included in the calyx.

Many herbaceous species of the genus occur in Mexico. The shrubby forms are of scarcely any economic importance, and very few vernacular names are recorded for them. An infusion of the leaves of some species is said to be employed in Ecuador as a remedy for indigestion.

A. Flowers pediceled, reflexed.
- Calyx lobes longer than the tube.
  - Leaves and stem glabrous.
    - Leaflets 17 to 37, less than 2 mm. long ..... 1. P. filiciformis.
    - Leaflets 5 or 7, 3 to 4 mm. long ..... 2. P. berlandieri.
  - Leaves and stem pubescent.
    - Calyx lobes filiform, plumose; flowers subtended by 1 to 3 prominent glands ..... 3. P. sericocalyx.
    - Calyx lobes lance-subulate, not plumose; flowers not subtended by glands.
      - Flowers 8 to 10 mm. long; leaflets 15 to 29 ..... 4. P. calycosa.
      - Flowers about 6 mm. long; leaflets 9 to 17 ..... 5. P. orcuttii.
- Calyx lobes shorter than the tube or barely equaling it.
  - Leaves simple.
    - Leaves, at least the lower ones, obovate or spatulate, toothed; ovules 4 to 6; calyx with a single gland in each interval ..... 6. P. spinosa.
    - Leaves narrowly linear; ovules 2; glands 2 or more in each interval.
      - Branches glabrate, bright green; leaves sparsely pubescent. 7. P. schottii.
      - Branches densely gray-strigose, becoming yellowish; leaves densely strigose ..... 8. P. puberula.
  - Leaves pinnate.
    - Calyx hairy outside.
      - Leaves conspicuously hairy.
        - Pubescence of the stem and peduncles spreading ..... 9. P. goldmani.
        - Pubescence of the stem and peduncles appressed.
          - Calyx canescent throughout ..... 10. P. parryi.
          - Calyx glabrous below, canescent-hirsute above ..... 11. P. maritima.
      - Leaves glabrous or nearly so.
        - Stems decumbent, pilose ..... 12. P. procumbens.
        - Stems erect, glabrous or sparsely strigose.
          - Leaflets punctate above ..... 31. P. hospes.
          - Leaflets not punctate above.
            - Leaflets 2 mm. long, retuse; calyx 2.5 mm. long ..... 13. P. palmeri.
            - Leaflets 7 to 10 mm. long, obtuse; calyx 3 to 3.5 mm. long. 14. P. neglecta.
    - Calyx glabrous outside.
      - Calyx hairy inside.
        - Calyx strongly angled, not conspicuously glandular.
          - Leaves pubescent.
            - Leaflets sparsely pilose; stem glabrous ..... 15. P. anthonyi.
            - Leaflets densely strigose; stem canescent ..... 11. P. maritima.
          - Leaves glabrous.
            - Leaflets linear ..... 16. P. radicans.
            - Leaflets oblong or oval.
              - Branches strigose ..... 22. P. oculata.
              - Branches glabrous.
                - Upper 4 calyx lobes acute ..... 17. P. variegata.
                - Upper 4 calyx lobes obtuse ..... 18. P. divaricata.

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Calyx not strongly angled, conspicuously glandular.
Leaflets pubescent on the upper surface; racemes lax. Petals purplish ..... 19. P. schaffneri.
Leaflets glabrous on both surfaces; racemes dense.
Petals, except the banner, purplish ..... 20. P. hegewischiana.
Petals all greenish yellow ..... 21. P. viridiflora.
Calyx glabrous within.
Calyx lobes equaling the tube.
Branches strigose ..... 22. P. oculata.
Branches glabrous.
Racemes short, at the ends of short leafy branches. 23. P. crenulata.
Racemes 8 to 12 cm. long, on naked peduncles opposite the leaves ..... 24. P. elongata.
Calyx lobes much shorter than the tube.
Leaf rachis distinctly winged, constricted at the nodes. 25. P. nutans.
Leaf rachis not winged but slightly margined.
Racemes headlike or subumbellate ..... 26. P. gracillima.
Racemes elongate, not headlike.
Racemes 2 to 5-flowered, lax ..... 27. P. diffusa.
Racemes many-flowered, dense.
Racemes 1 to 2 cm. long; plants decumbent. 28. P. dispansa.
Racemes 3 to 8 cm. long; plants erect ..... 29. P. submontana.

AA. Flowers sessile, ascending.
B. Calyx lobes subulate-tipped, usually longer than the tube.
Spikes subsessile at the ends of short axillary branches as well as at the ends of the main branches.
Leaves and branches glabrous or nearly so, except when very young.
Spikes short but not capitate, mostly short-pedunculate or at the ends of short leafy branches ..... 30. P. scandens.
Spikes capitate, sessile in the leaf axils and at the ends of the branches.
Leaflets 11 or 13, 3 to 4 mm. long ..... 31. P. capitulata.
Leaflets 5 to 9, 4 to 11 mm. long ..... 32. P. tehuacana.
Leaves and branches conspicuously villous.
Calyx without conspicuous glands between the ribs ..... 65. P. sessilis.
Calyx with conspicuous glands between the ribs.
Bracts ovate, acute, scarcely longer than the calyx tube.
Spikes, at least in fruit, lax; leaf rachis evidently winged. 33. P. domingensis.
Spikes short and dense; rachis scarcely winged ..... 34. P. humilis.
Bracts lance-ovate, long-acuminate, much exceeding the calyx tube. 35. P. occidentalis.
Spikes terminating the stem and branches.
C. Petals yellow, fading to rose or purplish.
Calyx not conspicuously gland-dotted between the ribs; leaves glabrous.
Calyx tube glabrous ..... 42. P. argyrostachya.
Calyx tube pubescent.
Leaflets 7 to 11, often emarginate, blackening in drying. 36. P. melantha.
Leaflets 11 to 35, not emarginate, not blackening.
Leaflets 2 to 6 mm. long; corolla less than 1 cm. long. 37. P. zimapanica.

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Leaflets 7 to 9 mm. long; corolla more than 1 cm. long.
38. P. diversicolor.

Calyx with a row of conspicuous glands between the ribs; leaves usually more or less pubescent.

Calyx glabrous only at the base, more or less pilose between the ribs as well as on the margin.

Bracts caudate-acuminate, longer than the calyx__**39. P. caudata.**

Bracts acute or short-acuminate, shorter than the calyx.

Corolla 10 mm. long; bracts pubescent_____**40. P. lutea.**

Corolla 7 mm. long; bracts glabrous on the back__**41. P. wardii.**

Calyx wholly glabrous except on the margins.

Leaves glabrous.

Stems glabrous_____**42. P. argyrostachya.**

Stems puberulent_____**43. P. botterii.**

Leaves pubescent.

Bracts acute or gradually short-acuminate.

Leaflets elliptic-obovate, pubescent on both sides.
44. P. plumosa.

Leaflets oblong, glabrous on the upper surface.
45. P. painteri.

Bracts abruptly caudate-acuminate.

Petals dark blue_____**46. P. atrocyanea.**

Petals yellow.

Leaflets hairy on both sides; stem long-hairy.
47. P. gigantea.

Leaflets glabrate on the upper surface; stem short-hairy.
48. P. macrostachya.

CC. Petals purple or bluish to white, only the banner, if any of the petals, ochroleucous.

D. Leaves glabrous.

Leaflets 41 to 71.

Leaflets oblong, channeled. Calyx lobes longer than the tube.
49. P. crassifolia.

Leaflets oval, flat.

Bracts much longer than the calyx; calyx lobes equaling the tube_____**50. P. roseiflora.**

Bracts not exceeding the calyx; calyx lobes shorter than the tube_____**51. P. longifolia.**

Leaflets 7 to 31.

Spikes short and dense, subcapitate, subsessile.

Spikes many-flowered; calyx lobes about equaling the tube.
52. P. saffordii.

Spikes few-flowered; calyx lobes much longer than the tube.

Bracts glabrous; calyx lobes about 6 mm. long.
53. P. formosa.

Bracts silky-pilose; calyx lobes 3.5 to 4 mm. long.
54. P. purpusi.

Spikes elongate, distinctly pedunculate.

Calyx tube glabrous or nearly so_____**43. P. botterii.**

Calyx tube densely pubescent.

Branches conspicuously gland-dotted_____**55. P. brandegei.**

Branches not conspicuously gland-dotted.

Leaflets broadly oblong; calyx lobes shorter than the tube.
56. P. smithii.

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Leaflets linear to narrowly oblong; calyx lobes equaling or exceeding the tube.
Calyx appressed-sericeous; leaves slightly pubescent when young ---------- 57. P. glabrescens.
Calyx loosely pilose; leaves glabrous from the first.
Leaflets linear-oblong, slightly involute; petals rose-purple ---------- 58. P. lasiostachya.
Leaflets linear, strongly involute; petals pink or whitish ---------- 59. P. involuta.

DD. Leaves conspicuously pubescent.
Plants densely sericeous.
Leaves 3-foliolate ---------- 60. P. eriophylla.
Leaves 5 to 11-foliolate ---------- 61. P. greggii.
Plants not densely sericeous.
Petals (except sometimes the banner) dark purple.
Calyx lobes shorter than the tube ---------- 62. P. oaxacana.
Calyx lobes equaling or longer than the tube.
Bracts deciduous ---------- 83. P. emoryi.
Bracts persistent.
Leaflets narrowly oblong, 2 to 4 mm. long, pubescent on both sides ---------- 63. P. tsugoides.
Leaflets broadly oblong, 4 to 7 mm. long, glabrous on the upper surface.
Corolla rose-purple; calyx not conspicuously glandular. 64. P. versicolor.
Corolla dark bluish purple; calyx with conspicuous glands between the ribs ---------- 46. P. atrocyanea.
Petals rose-colored to white.
Spikes short, often subglobose, sessile at the ends of short leafy branches ---------- 65. P. sessilis.
Spikes elongate, usually pedunculate at the ends of elongate branches.
Leaflets villous-sericeous; branches villous-canescent.
Branches glandular-tuberculate; petals usually without glands ---------- 66. P. megalostachys.
Branches not conspicuously glandular; petals with a large gland near the apex ---------- 67. P. wislizeni.
Leaflets and branches finely short-pubescent.
Leaflets obtuse, sparsely pilose or glabrate above; corolla rose ---------- 68. P. sanctae-crucis.
Leaflets acute, finely short-pubescent above; corolla nearly white ---------- 69. P. leucantha.

BB. Calyx lobes short, ovate or lanceolate, usually much shorter than the tube, rarely subulate-tipped.
Corolla yellow.
Fruit exserted from the calyx.
Stipular spines 3 to 9 mm. long; only the terminal leaflet retuse; banner about twice as broad as the other petals -- 70. P. benthami.
Stipular spines 1 to 2 mm. long; all leaflets retuse; banner 3 to 4 times as broad as the other petals ---------- 71. P. megacarpa.
Fruit not exserted.
Spikes elongate; corolla fading to purple; bracts caducous. 72. P. acutifolia.

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Spikes subcapitate; corolla fading yellow; bracts persistent.
Stems pubescent.....73. P. capitata.
Stems glabrous.
Bracts brown, not conspicuously glandular; pubescence of the calyx appressed.....74. P. quinqueflora.
Bracts yellow, with green tip, conspicuously glandular; pubescence of the calyx not appressed.....75. P. lloydii.
Corolla (except sometimes the banner) not yellow.
Petals white.
Calyx tube glabrous.....76. P. mucronata.
Calyx tube pubescent.
Leaflets 3 to 5 mm. long, linear; bracts persistent..77. P. lumholtzii.
Leaflets more than 10 mm. long, oval or oblong; bracts caducous.
Calyx lobes deltoid-acuminate, fully half as long as the tube; spikes paniculate, nodding.....78. P. eysenhardtioides.
Calyx lobes triangular, acute, one-third as long as the tube; spikes mostly axillary, erect.....79. P. leucostachys.
Petals wholly or partly purple, pink, or blue.
Calyx glabrous or sparsely silky-strigose outside, the lobes ciliolate, broader than long.
Calyx glabrous; flowers sessile.....80. P. frutescens.
Calyx sericeous-strigose; flowers short-pedicellate..81. P. hospes.
Calyx pubescent outside, at least on the lobes, these longer than broad.
Leaflets large, 1 to 2 cm. long, acute; corolla yellow at first. 72. P. acutifolia.
Leaflets mostly small, sometimes large, nearly always obtuse; wing and keel petals always purple, pink, or blue.
Petals dark blue.
Leaflets 2 to 4 mm. long, elliptic or oval.....82. P. pilosissima.
Leaflets 5 to 20 mm. long, or sometimes larger.
Leaves simple.....84. P. scoparia.
Leaves pinnate.
Calyx lobes unequal, the lowest one distinctly longer; leaves glabrous.....85. P. juncea.
Calyx lobes subequal; leaves sparsely or densely canescent.
Leaflets entire or sinuate, oval to oblong..86. P. tinctoria.
Leaflets distinctly dentate.
Leaflets obovate to oblanceolate; stem and leaves decidedly canescent.....87. P. dentata.
Leaflets linear-lanceolate; stem and leaves somewhat pubescent but green.....88. P. arenaria.
Petals (except sometimes the banner) purple or pink.
Banner, as well as the other petals, purple.
Leaflets 13 to 31, oblong.....62. P. oaxacana.
Leaflets 31 to 65, linear.
Leaves glabrous.....89. P. pectinata.
Leaves canescent.....90. P. abietifolia.
Banner yellow or white.
Branches not conspicuously glandular-tuberculate.
Spikes solitary; leaflets glabrous, very numerous. 51. P. longifolia.
Spikes paniculate; leaflets few, canescent.
Petals purple.....91. P. tomentosa.
Petals pink, turning yellowish in age..92. P. psoraleoides.

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Branches conspicuously glandular-tuberculate. Spikes single.
Stems and leaves glabrous. Spikes headlike.
Spikes long-pedunculate; bracts much shorter than the calyx. Leaflets 2 to 3 mm. long---**93. P. hemsleyana.**
Spikes short-pedunculate; bracts equaling the calyx.
Bracts broadly obovate; leaflets 3 to 5 mm. long. **94. P. trochilina.**
Bracts lanceolate; leaflets 1 to 2 mm. long. **95. P. minutifolia.**
Stems and leaves more or less pubescent.
Calyx merely puberulent, brown; leaflets 11 to 21, 2 to 3 mm. long. Spikes oblong-------**96. P. naviculifolia.**
Calyx canescent; leaflets 3 to 7, if more numerous more than 3 mm. long.
Spikes elongate and lax in fruit. Bracts soon deciduous.
Leaves long-sericeous on both sides---**97. P. argyrea.**
Leaves short-pubescent on the upper surface.
Calyx villous-canescent. the lobes equaling the tube. Bracts ovate-acuminate, longer than the buds. **98. P. seemanni.**
Calyx silky-canescent with appressed hairs, the lobes shorter than the tube.
Bracts ovate or ovate-lanceolate, shorter than the buds----------**99. P. tuberculata.**
Bracts lance-subulate, longer than the buds. **100. P. canescens.**
Spikes dense and short, even in fruit.
Spikes (without the corollas) more than 1 cm. thick, acute at first; corolla more than 1 cm. long; leaflets 7 to 31.
Leaflets 7 to 13, sericeous---------**97. P. argyrea.**
Leaflets 13 to 31, short-pubescent with spreading hairs----------**101. P. conzattii.**
Spikes 7 to 8 mm. thick, obtuse; corolla less than 1 cm. long; leaflets 5 to 9.
Leaves glabrous above, minutely puberulent beneath----------**102. P. tuberculina.**
Leaves canescent on both sides.
Spikes oblong, 2 to 3 cm. long, distinctly pedunculate----------**103. P. fulvosericea.**
Spikes globose or short-oblong, 1 to 1.5 cm. long, subsessile or very short-pedunculate.
Pubescence appressed; leaflets 3 to 8 mm. long. **104. P. dorycnoides.**
Pubescence spreading; leaflets less than 3 mm. long.
Leaves greenish, minutely canescent; calyx silky-villous with brown hairs. **105. P. polycephala.**
Leaves and calyx villous-canescent with long whitish hairs----------**106. P. decora.**

1. **Parosela filiciformis** (Robins. & Greenm.) Rose, Contr. U. S. Nat. Herb. 8: 303. 1905.

Dalea filiciformis Robins. & Greenm. Proc. Amer. Acad. 29: 382. 1894.

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In dry soil, San Luis Potosí and Aguascalientes to Oaxaca; type from Villar, San Luis Potosí.

Plants very slender, 20 to 60 cm. high, with a thick woody root; stems, glabrous; leaflets 17 to 37, oval or suborbicular, 1 to 2 mm. long, glabrous; racemes 5 to 10 cm. long, remotely flowered; calyx villous; petals yellowish below, purplish above.

2. Parosela berlandieri (A. Gray) Rose, Contr. U. S. Nat. Herb. **10**: 106. 1906.

Dalea berlandieri A. Gray, Proc. Amer. Acad. **5**: 177. 1861.

San Luis Potosí and Tamaulipas; type from San Carlos, Tamaulipas.

Slender shrub, 0.5 to 1 meter high; branches glabrous; leaflets 5 or 7, cuneate or obovate-oblong, 3 to 4 mm. long, glabrous; racemes lax, 2 to 4 cm. long; calyx densely pilose; petals at first yellowish, becoming reddish; fruit pilose.

3. Parosela sericocalyx Rydb. N. Amer. Fl. **24**: 63. 1919.

Known only from the type collection, from the Sierra Madre of Durango or Sinaloa.

Slender shrub, 50 cm. high or more; stems silky-villous when young; leaflets 9 to 21, oval, sericeous on both sides, 10 to 15 mm. long; racemes 2 to 4 cm. long; calyx sericeous; petals reddish purple; fruit sericeous.

4. Parosela calycosa (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.

Dalea calycosa A. Gray, Pl. Wright. **2**: 40. 1853.

Chihuahua, Sonora, and Nuevo León; type collected on the San Pedro, Sonora. New Mexico and Arizona.

Plants suffrutescent, 10 to 30 cm. high or more; stems slender, strigose-canescent; leaflets 15 to 29, oval or obovate, 3 to 5 mm. long, obtuse or retuse, glabrous above, strigose beneath; racemes 2 to 4 cm. long, dense; calyx densely pilose; petals white and purple; fruit pilose.

5. Parosela orcuttii (S. Wats.) Parish, Bot. Gaz. **55**: 305. 1913.

Dalea orcuttii S. Wats. Proc. Amer. Acad. **20**: 359. 1885.

Northern Baja California; type from Topo and Cantillas Canyon. Southern California.

Stems suffrutescent, ascending, 10 to 20 cm. long, strigose-canescent; leaflets 9 to 17, oblong-obovate, 2 to 4 mm. long, glabrous above, strigose beneath; racemes 1 to 2 cm. long, dense; calyx hirsute-pilose; petals purple and whitish.

6. Parosela spinosa (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 7. 1900.

Dalea spinosa A. Gray, Mem. Amer. Acad. II. **5**: 315. 1854.

Dalea spinescens Hemsl. Biol. Centr. Amer. Bot. **1**: 247. 1880.

Psorodendron spinosum Rydb. N. Amer. Fl. **24**: 45. 1919.

Sonora and Baja California. Arizona and southern California; type from the Gila River, Arizona.

Densely branched shrub or small tree, 4 to 7 meters high; leaves 2 to 5 cm. long, irregularly dentate, early deciduous; recemes 3 to 5 cm. long, the rachis spinose; calyx strigose; petals dark blue; fruit canescent; wood soft, coarse-grained, brown, its specific gravity about 0.55. "Mangle" (Sonora).

The English name is "indigo-bush" or "indigo-thorn." The plant is very showy when in flower.

7. Parosela schottii (Torr.) Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Dalea schottii Torr. U. S. & Mex. Bound. Bot. 53. 1859.

Psorodendron schottii Rydb. N. Amer. Fl. **24**: 44. 1919.

Northern Baja California. Southern Arizona and California; type from the Colorado River.

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Densely branched shrub, 1 to 3 meters high, with spinose branches; leaves 0.5 to 3 cm. long; racemes 4 to 8 cm. long, 6 to 20-flowered; calyx sparsely short-hirsute or glabrate; petals blue.

8. Parosela puberula (Parish) Standl.

Parosela schottii puberula Parish, Bot. Gaz. **55**: 312. 1913.

Psorodendron puberulum Rydb. N. Amer. Fl. **24**: 45. 1919.

Northern Baja California. Southern California, the type from the Colorado Desert.

Densely branched shrub with spinose branches; leaves 1 to 2.5 cm. long; racemes 3 to 5 cm. long; calyx densely canescent; petals bluish purple, 1 cm. long; fruit puberulent.

Perhaps only a form of *P. schottii*.

9. Parosela goldmani Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Known only from the type locality, Sierra de Choix, Sinaloa.

Stems suffrutescent, 30 to 50 cm. high or more, short-hirsute, becoming glabrate, reddish; leaflets 15 to 35, oblong or elliptic, 3 to 4 mm. long, obtuse, white-hirsute; racemes 2 to 4 cm. long; calyx densely hirsute; petals bluish purple; fruit hirsutulous.

10. Parosela parryi (Torr. & Gray) Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Dalea divaricata cinerea A. Gray, Proc. Amer. Acad. **7**: 336. 1868.

Dalea parryi Torr. & Gray; A. Gray, Proc. Amer. Acad. **7**: 397. 1868.

Sonora and Baja California. Southern Arizona and California; type from Fort Mohave, California.

Stems slender, suffruticose, 30 to 60 cm. high, gray-strigose; leaflets 15 to 33, obovate or suborbicular, 2 to 5 mm. long, emarginate, strigose; racemes 3 to 8 cm. long; calyx strigose-canescent; petals violet; fruit minutely puberulent.

11. Parosela maritima (T. S. Brandeg.) Rose, Contr. U. S. Nat. Herb. **8**: 304. 1905.

Dalea maritima T. S. Brandeg. Proc. Calif. Acad. II. **3**: 125. 1891.

Southern Baja California; type from Todos Santos.

Stems suffruticose, decumbent, densely white-pubescent; leaflets 15 to 23, oblong-obovate, 3 to 4 mm. long, densely canescent; racemes 1 to 3 cm. long, dense; calyx glabrous below, hirsute above; petals purple; fruit glabrous.

12. Parosela procumbens (Moc. & Sessé) Rose, Contr. U. S. Nat. Herb. **8**: 304. 1905.

Dalea procumbens Moc. & Sessé; DC. Prodr. **2**: 246. 1825.

Dry hillsides, Jalisco to Chiapas (type locality).

Stems suffruticose, prostrate, 30 to 50 cm. long, reddish, pilose; leaflets 15 to 21, oval or obovate, 2 to 3 mm. long, glabrous, crenulate; racemes 1 to 2 cm. long, dense; calyx pilose on the ribs; petals bright purple; fruit puberulent.

13. Parosela palmeri Rose, Contr. U. S. Nat. Herb. **8**: 304. 1905.

Dry hillsides, Sonora and Sinaloa; type from Alamos, Sonora.

Slender shrub, 0.5 to 1 meter high, glabrous or nearly so; leaflets 11 to 21, elliptic or obovate, 2 mm. long, retuse, glabrous; racemes 4 to 6 cm. long, lax; calyx puberulent; petals ochroleucous, tipped and margined with purple.

14. Parosela neglecta (Robinson) Rose, Contr. U. S. Nat. Herb. **8**: 304. 1905.

Dalea neglecta Robinson, Proc. Amer. Acad. **29**: 329. 1894.

Known only from Guanajuato, the type locality.

Stems woody below, 30 to 50 cm. high, glabrous; leaflets 11 to 15, elliptic or oblanceolate, 7 to 10 mm. long, rounded at apex, glabrous, glaucous beneath; racemes lax, 2 to 4 cm. long; calyx puberulent; petals deep purple.

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15. Parosela anthonyi (T. S. Brandeg.) Rose, Contr. U. S. Nat. Herb. **12**: 272. 1909.

Dalea anthonyi T. S. Brandeg. Erythea **7**: 2. 1899.

Southern Baja California; type from San José del Cabo.

Shrub, about 1 meter high; branches glabrous or nearly so; leaflets 13 to 21, oblong, obtuse, 3 to 5. mm. long, sparsely pilose; racemes lax, 2 to 7 cm. long; calyx glabrous; petals bluish purple, variegated with yellow; fruit glabrous.

16. Parosela radicans (S. Wats.) Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Dalea radicans S. Wats. Proc. Amer. Acad. **17**: 341. 1882.

Coahuila; type from the Sierra Madre, south of Saltillo.

Stems suffruticose, erect or procumbent, 10 to 40 cm. long, glabrous; leaflets 13 to 19, linear, 2 to 4 mm. long, glabrous; racemes 1 to 2 cm. long, lax; calyx glabrous; petals purple.

17. Parosela variegata Rydb. N. Amer. Fl. **24**: 55. 1919.

Southern Baja California; type from San José del Cabo.

Slender shrub, 50 cm. high or more; branches purplish, glabrous; leaflets 19 to 25, elliptic, 3 to 4 mm. long, retuse, glabrous; racemes 3 to 6 cm. long; calyx glabrous; petals blue, white, and yellowish; fruit glabrous.

18. Parosela divaricata (Benth.) Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Dalea divaricata Benth. Bot. Voy. Sulph. 12. 1844.

Baja California; type from Magdalena Bay.

Stems suffruticose, diffusely branched, brownish, glabrous; leaflets 15 to 21, oblong or obovate, 2 to 4 mm. long, obtuse or emarginate, glabrous; racemes 2 to 3 cm. long; calyx glabrous; petals purplish; fruit glabrous.

19. Parosela schaffneri (Hemsl.) Rose, Contr. U. S. Nat. Herb. **12**: 273. 1909.

Dalea schaffneri Hemsl. Diag. Pl. Mex. 7. 1878.

Known only from the type locality, Chapultepec, Distrito Federal.

Stems suffruticose, glabrous; leaflets 15 to 41, oblong or elliptic, 4 mm. long, pilose above; racemes lax; calyx glabrous; petals purple and yellowish.

20. Parosela hegewischiana (Steud.) Rydb. N. Amer. Fl. **24**: 57. 1919.

Dalea laxiflora Schlecht. Linnaea **12**: 293. 1838. Not *D. laxiflora* Pursh, 1814.

Dalea hegewischiana Steud. Nom. Bot. ed. 2. **1**: 480. 1840.

? *Trichopodium glandulosum* Presl, Bot. Bemerk. 52. 1844.

Dalea rosea D. Dietr. Syn. Pl. **4**: 1017. 1847.

Parosela lasiostoma Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Parosela campylostachya Rose, Contr. U. S. Nat. Herb. **12**: 272. 1909.

Hidalgo to Oaxaca.

Stems slender, suffruticose, decumbent, glabrous; leaflets 13 to 35, oval or obovate, 2 to 5 mm. long, glabrous; racemes dense, 2 to 4 cm. long; calyx glabrous; petals rose-purple, the banner yellowish; fruit glabrous.

21. Parosela viridiflora (S. Wats.) Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Dalea viridiflora S. Wats. Proc. Amer. Acad. **21**: 448. 1886.

Chihuahua to Hidalgo; type from Santa Eulalia Mountains, Chihuahua.

Stems slender, decumbent, suffrutescent, 20 to 30 cm. long, yellowish, glabrous; leaflets 9 to 17 oblong-obovate, 3 to 7 mm. long, obtuse or retuse, glabrous; racemes dense, 2 to 5 cm. long; petals greenish yellow; fruit glabrous.

22. Parosela oculata Rydb. N. Amer. Fl. **24**: 60. 1919.

Known only from the type locality, Cerralvo, Baja California.

Low shrub; branches strigose; leaflets 25 to 37, oblong, 5 mm. long, glabrous; racemes 3 to 8 cm. long, dense; petals purplish blue, with a cream-colored spot on the banner.

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23. Parosela crenulata (Hook. & Arn.) Rose, Contr. U. S. Nat. Herb. **8**: 306. 1905.

Dalea crenulata Hook. & Arn. Bot. Beechey Voy. 285. 1836.

Sonora to Guerrero; type from Jalisco.

Slender shrub, sometimes 2 meters high; branches dark brown, glabrous; leaflets 7 to 13, elliptic, 2 to 4 mm. long, crenulate, glabrous; racemes dense, 1 to 3 cm. long; petals purple; fruit glabrous. "Malva prieta" (Sinaloa).

The slender branches are used for brooms.

24. Parosela elongata Rose, Contr. U. S. Nat. Herb. **8**: 306. 1905.

Known only from the type locality, Jojutla, Morelos.

Stems 0.5 to 1 meter high, glabrous; leaflets 7 to 15, oblong, 7 to 12 mm. long, glabrous; calyx glabrous; petals purple; fruit glabrous.

25. Parosela nutans (Cav.) Rose, Contr. U. S. Nat. Herb. **8**: 306. 1905.

Psoralea nutans Cav. Icon. Pl. **3**: 1. *pl. 201.* 1794.

Dalea nutans Willd. Sp. Pl. **3**: 1339. 1803.

Sonora to Yucatán and Chiapas. Central America.

Stems slender, suffruticose, sometimes 3 meters high, purplish, glabrous; leaflets 11 to 41, oblong, 5 to 10 mm. long, glabrous; racemes lax; calyx glabrous; petals purple; fruit glabrous. "Canchalagua" (Guatemala).

In Jalisco a yellow dye is obtained from the plant.

26. Parosela gracillima (S. Wats.) Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Dalea gracillima S. Wats. Proc. Amer. Acad. **22**: 404. 1887.

Jalisco; type from Guadalajara.

Stems very slender, suffruticose, procumbent, reddish, glabrous, 30 to 50 cm. long; leaflets 13 to 21, oblanceolate, 1 to 4 mm. long, glabrous; racemes 2 to 6-flowered; calyx glabrous; petals purple, the banner yellowish; fruit glabrous.

27. Parosela diffusa (Moric.) Rose, Contr. U. S. Nat. Herb. **8**: 305. 1905.

Dalea diffusa Moric. Mém. Soc. Genève **6**: 536. 1833.

Dalea gracilis Hook. & Arn. Bot. Beechey Voy. 286. 1836. Not *D. gracilis* Kunth, 1824.

Dalea ramosissima Mart. & Gal. Bull. Acad. Brux. **10**[2]: 41. 1843.

Chihuahua and Sonora to San Luis Potosí and Guerrero. Guatemala.

Slender shrub, often a meter high; branches glabrous, purplish; leaflets 3 to 23, oblong or obovate, 2 to 5 mm. long, glabrous; racemes lax, 2 to 5-flowered; calyx glabrous; petals purple, the banner usually yellowish; fruit glabrous. "Escoba larga" (Morelos, *Seler*); "ratón." "xolteco" (*Ramírez*).

As in the case of various other species, the branches are often tied together to form coarse brooms.

28. Parosela dispansa Rydb. N. Amer. Fl. **24**: 59. 1919.

Known only from the type locality, mountains near Talpa, Jalisco.

Stems slender, suffruticose, glabrous, dark brown; leaflets 9 to 13, elliptic, 3 to 5 mm. long, retuse, glabrous; racemes 1 to 2 cm. long; calyx glabrous; petals violet or rose-purple; fruit glabrous.

29. Parosela submontana Rose, Contr. U. S. Nat. Herb. **8**: 306. 1905.

Chihuahua to Puebla and Oaxaca; type from Plateado, Zacatecas.

Stems slender, suffruticose, 0.5 to 1.2 meters high, glabrous, purplish; leaflets 31 to 41, oblong, 5 to 10 mm. long, glabrous; racemes 3 to 8 cm. long, rather dense; calyx glabrous; petals purple; fruit glabrous.

30. Parosela scandens (Mill.) Rydb. N. Amer. Fl. **24**: 114. 1920.

Psoralea scandens Mill. Gard. Dict. ed. 8. *Psoralea* no. 4. 1768.

Veracruz.

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Glabrous shrub with brown branches; leaflets 7 or 9, elliptic, 8 to 15 mm. long, glabrous; spikes short, globose or oblong; calyx tube nearly glabrous, the lobes plumose; petals yellow.

31. **Parosela capitulata** Rydb. N. Amer. Fl. 24: 113. 1920.

Known only from the type locality, in Oaxaca.

Glabrous shrub with purplish brown branches; leaflets 11 or 13, oblong, 3 to 4 mm. long, glabrous; spikes capitate; calyx tube sparsely hairy, the lobes plumose; petals brownish purple (when dry).

32. **Parosela tehuacana** Rydb. N. Amer. Fl. 24: 113. 1920.

Known only from the type locality, Tehuacán, Puebla.

Low shrub with brown glabrous branches; leaflets obovate, 3 to 7 mm. long, sparsely short-villous when young but soon glabrous; spikes globose; calyx tube pilose, the lobes plumose; petals yellow, turning dark purple; fruit villous above.

33. **Parosela domingensis** (DC.) Millsp. Field Mus. Bot. 1: 21. 1895.

Dalea domingensis DC. Prodr. 2: 246. 1825.

Yucatán. Cuba and Hispaniola (type locality).

Shrub, 1 to 4 meters high, the branches villous; leaflets 5 to 9, oval or obovate, 6 to 15 mm. long, villous on both sides; spikes becoming 2 to 4 cm. long; calyx pubescent, the lobes plumose; petals ochroleucous, turning pink or purple; fruit villous.

34. **Parosela humilis** (Mill.) Rydb. N. Amer. Fl. 24: 114. 1920.

Psoralea humilis Mill. Gard. Dict. ed. 8. *Psoralea* no. 7. 1768.

Dalea thyrsiflora A. Gray, Proc. Amer. Acad. 5: 177. 1861.

Parosela thyrsiflora Vail, Bull. Torrey Club 24: 14. 1897.

Chihuahua to Yucatán and Oaxaca; type from Veracruz. Texas; Guatemala.

Slender shrub with brownish villous branches; leaflets 3 to 9, oval or obovate, 6 to 18 mm. long, retuse, short-villous; spikes short and dense; calyx pubescent, the lobes plumose; petals yellow, turning brownish purple.

35. **Parosela occidentalis** Rydb. N. Amer. Fl. 24: 115. 1920.

Parosela platyphylla Rydb. N. Amer. Fl. 24: 115. 1920.

Sonora and Sinaloa; type from Culiacán (?), Sinaloa.

Shrub, 1 to 1.5 meters high, the branches villous; leaflets 5 to 15, oval or obovate, 5 to 15 mm. long, villous; spikes 1 to 3 cm. long, dense; calyx villous, the lobes plumose; petals yellow, turning brown or purplish; fruit villous.

36. **Parosela melantha** (Schauer) Rydb. N. Amer. Fl. 24: 108. 1920.

Dalea melantha Schauer, Linnaea 20: 746. 1847.

Parosela fuscescens Rydb. N. Amer. Fl. 24: 109. 1919.

Coahuila to Veracruz and Oaxaca (type locality).

Shrub with glabrous branches; leaflets 5 to 13, cuneate, 2 to 6 mm. long, retuse, glabrous; spikes 1 to 4 cm. long, 1 cm. thick; petals yellow; fruit pilose.

37. **Parosela zimapanica** (Schauer) Rydb. N. Amer. Fl. 24: 109. 1920.

Dalea zimapanica Schauer, Linnaea 20: 746. 1857.

Mexico, Hidalgo, Puebla, and Oaxaca; type from Zimapán, Hidalgo.

Shrub, 1 to 3 meters high, with glabrous branches; leaflets 11 to 19, elliptic or oblong, 2 to 6 mm. long, glabrous; spikes 1.5 to 3 cm. long, 1.2 to 1.5 cm. thick; calyx silky-villous; petals yellow, turning purplish brown or brownish pink; fruit villous.

This has been reported from Mexico as *Dalea microphylla* H. B. K.

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38. Parosela diversicolor Rydb. N. Amer. Fl. **24**: 109. 1920.

Known only from the type locality, Sierra de Clavellinas, Oaxaca.

Shrub, 1 meter high or more, with glabrous branches; leaflets 13 to 35, oblong, 7 to 9 mm. long, glabrous; spikes dense, 1 to 2 cm. long; calyx silky-villous, the lobes plumose; petals yellow, turning rose and purple; fruit silky-villous.

39. Parosela caudata Rydb. N. Amer. Fl. **24**: 112. 1920.

Known only from the type locality, Alvárez, San Luis Potosí.

Shrub, 1 meter high or more, the branches densely villous; leaflets 13 to 17, oblong or elliptic, 5 to 6 mm. long, villous; spikes dense, 2 to 6 cm. long, 1 cm. thick; calyx silky-pilose, the lobes plumose; petals yellow, turning brownish; fruit villous.

40. Parosela lutea Cav. Descr. Pl. 186. 1802.

Psoralea lutea Cav. Icon. Pl. **4**: 12. *pl.* 325. 1797.

Dalea ovalifolia Ortega, Hort. Matr. Dec. 30. 1797.

Dalea lutea Willd. Sp. Pl. **3**: 1341. 1803.

Nuevo León to Puebla. Guatemala.

Shrub, 30 to 50 cm. high, the branches densely pubescent; leaflets 15 to 21, elliptic or oval, 4 to 6 mm. long, often retuse, pilose, sometimes glabrate on the upper surface; spikes dense, 5 to 8 cm. long, 1 cm. thick; calyx pilose, the lobes pilose-ciliate; petals yellow; fruit villous.

41. Parosela wardii Rydb. N. Amer. Fl. **24**: 112. 1920.

Tamaulipas and San Luis Potosí; type collected at San Luis Potosí.

Shrub, 30 to 60 cm. high, the branches pubescent; leaflets 9 to 15, oblong, 3 to 8 mm. long, villous-canescent, obtuse; spikes dense, 2 to 3 cm. long; calyx silky-pilose, the lobes plumose; petals yellow, fading brownish; fruit densely pubescent.

This has been reported as *Dalea leucostoma* var. and as *D. cinerea* Moric.

42. Parosela argyrostachya (Hook. & Arn.) Rydb. N. Amer. Fl. **24**: 110. 1920.

Dalea argyrostachya Hook. & Arn. Bot. Beechey Voy. 285. 1836.

Chihuahua to Guerrero and Chiapas; type from Jalisco.

Shrub 50 cm. high or more, with glabrous branches; leaflets 15 to 21, oblong or obovate, glabrous; spikes dense, 3 to 6 cm. long, acute; calyx glabrous, the lobes plumose; petals yellow, turning brownish; fruit pubescent above, glabrous below.

43. Parosela botterii Rydb. N. Amer. Fl. **24**: 110. 1920.

Known only from the type locality, Orizaba, Veracruz.

Stems glabrous or when young brownish-villous; leaflets 17 to 21, elliptic, 2 to 4 mm. long, glabrous; spikes dense, 3 to 5 cm. long, acute; calyx sparsely hirsute, the lobes plumose; petals rose-purple.

44. Parosela plumosa (S. Wats.) Rose, Contr. U. S. Nat. Herb. **10**: 106. 1906.

Dalea plumosa S. Wats. Proc. Amer. Acad. **21**: 448. 1886.

Chihuahua, the type collected near the city of Chihuahua.

Shrub 30 to 50 cm. high, the branches finely pubescent; leaflets 11 to 17, elliptic-obovate, 4 to 6 mm. long, minutely pilose; spikes dense, 2 to 4 cm. long, 1 cm. thick; calyx glabrous, the lobes long-pilose; petals yellow, turning brownish; fruit pubescent.

45. Parosela painteri Rose, Contr. U. S. Nat. Herb. **10**: 105. 1906.

Querétaro; type from San Juan del Río.

Shrub 30 to 50 cm. high, the branches puberulent; leaflets 11 to 15, oblong, 5 mm. long, retuse, glabrous above, minutely pubescent beneath; spikes 2 to 3 cm. long; calyx glabrous, the lobes long-pilose; petals yellow, turning brownish purple; fruit densely pubescent.

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46. Parosela atrocyanea Rydb. N. Amer. Fl. **24**: 111. 1920.

Known only from the type locality, San Luis Tultitlanapa, Puebla.

Low shrub with strigose branches; leaflets 9 to 17, oblong or obovate, 4 to 7 mm. long, glabrous above, strigose beneath; spikes dense, 1.5 to 3.5 cm. long, 1 cm. thick; calyx tube nearly glabrous, the lobes ciliate; petals at first yellow (?), turning dark blue, the banner wholly or partly yellow; fruit pubescent above, glabrous below.

47. Parosela gigantea Rose; Rydb. N. Amer. Fl. **24**: 110. 1920.

Michoacán and Puebla; type from Tarascón, Michoacán.

Shrub, 2 to 5 meters high, the branches villous; leaflets 11 to 17, oval or obovate, 6 to 10 mm. long, pilose; spikes 3 to 6 cm. long, 1 cm. thick, dense, acute; calyx tube glabrous, the lobes long-pilose; petals yellow, turning blackish; fruit sparsely pilose.

48. Parosela macrostachya (Moric.) Rose, Contr. U. S. Nat. Herb. **12**: 273. 1909.

Dalea macrostachya Moric. Mém. Soc. Genève **6**: 543. *pl. 5.* 1833.

Dalea leucostoma Schlecht. Linnaea **12**: 294. 1838.

Hidalgo.

Shrub, 0.3 to 1 meter high, the branches at first pubescent, becoming glabrate; leaflets 17 to 25, oblong or elliptic, 5 to 7 mm. long, glabrous above, pilose beneath; spikes 2 to 4 cm. long; petals yellow; fruit sericeous.

49. Parosela crassifolia (Hemsl.) Rose, Contr. U. S. Nat. Herb. **12**: 272. 1909.

Dalea crassifolia Hemsl. Biol. Centr. Amer. Bot. **1**: 238. 1880.

Sinaloa and Jalisco; type from the Sierra Madre of Sinaloa or Durango.

Shrub, 50 cm. high or more, with long glabrous branches; leaflets oblong, 3 to 4 mm. long, fleshy, glabrous; spikes dense, 2 to 3 cm. long; calyx tube silky-pilose, the lobes plumose; petals pale pink or nearly white; fruit densely pilose above.

50. Parosela roseiflora Rydb. N. Amer. Fl. **24**: 105. 1920.

Type from the Sierra Madre of Durango or Sinaloa.

Plants glabrous, 40 cm. high or more; leaflets 25 to 41, elliptic, 5 mm. long, obtuse; spikes dense, 2 cm. long; calyx tube sericeous, the lobes plumose; petals rose; fruit silky-villous.

51. Parosela longifolia Rose; Rydb. N. Amer. Fl. **24**: 105. 1920.

Known only from the type locality, between Altenguilla and Jacala, Jalisco.

Stems glabrous, 1 meter high or more; leaflets 31 to 37, oval, 3 to 4 mm. long, glabrous; spikes dense, 2 to 3 cm. long, 1 cm. thick; calyx tube silky-pilose; banner yellowish, the other petals light rose; fruit sericeous.

52. Parosela saffordii Rose, Contr. U. S. Nat. Herb. **12**: 273. 1909.

Coahuila (type locality) and Durango.

Low shrub with glabrous branches; leaflets 9 to 13, oblanceolate or obovate, 2 to 3 mm. long, glabrous; calyx tube pilose; petals rose-colored; pod pubescent.

53. Parosela formosa (Torr.) Vail, Trans. N. Y. Acad. Sci. **14**: 34. 1894.

Dalea formosa Torr. Ann. Lyc. N. Y. **2**: 177. 1827.

Chihuahua and Sonora. Colorado to Texas and Arizona; type from the Platte River, Colorado.

Crooked shrub, 0.3 to 1 meter high, with glabrous branches; leaflets 7 or 9, oblong-spatulate, 1.5 to 2 mm. long, glabrous; calyx tube pilose, the lobes plumose; petals purple-rose; fruit pilose.

A very handsome shrub when in flower.

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54. Parosela purpusi (T. S. Brandeg.) Rose, Contr. U. S. Nat. Herb. 10: 106. 1906.

Dalea purpusi T. S. Brandeg. Erythea 7: 2. 1899.

Baja California; type from Calmalli.

Densely branched shrub, 30 to 40 cm. high, the branches glabrous or strigillose; leaflets 3 or 5, obovate, 4 to 6 mm. long, strigose; spikes 1.5 cm. long; calyx tube sericeous, the lobes plumose; petals pink; fruit sericeous.

55. Parosela brandegei Rose, Contr. U. S. Nat. Herb. 10: 106. 1906.

Dalea ramosissima Benth. Bot. Voy. Sulph. 11. 1844. Not *D. ramosissima* Mart. & Gal. 1843.

Parosela ramosissima Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Baja California; type from Magdalena Bay.

Shrub with reddish glabrous branches; leaflets 11 or 13, obovate, 2 to 5 mm. long, obtuse or retuse, glabrous; spikes dense, 3 to 5 cm. long, 1 cm. thick; calyx densely pilose; petals rose-colored; fruit sparsely pilose.

56. Parosela smithii Rydb. N. Amer. Fl. 24: 106. 1920.

Oaxaca to Hidalgo; type from Sierra de San Felipe, Oaxaca.

Slender shrub about 1 meter high, the stems glabrous; leaflets 13 to 21, oblong, 5 to 8 mm. long, obtuse, glabrous; spikes dense, 1.5 to 4 cm. long, 1 cm. thick; calyx densely sericeous; petals rose-purple; fruit densely sericeous above.

57. Parosela glabrescens Rydb. N. Amer Fl. 24: 106. 1920.

San Luis Potosí.

Slender shrub 50 cm. high or taller, the stems glabrous or slightly pubescent; leaflets 15 to 21, elliptic, acute or obtuse, sparsely pilose at first; spikes dense, 1.5 to 3 cm. long, 1 cm. thick; calyx silky-pilose; petals pale rose or nearly white.

58. Parosela lasiostachya (Benth.) Rose, Contr. U. S. Nat. Herb. 10: 107. 1906.

Dalea lasiostachya Benth. Pl. Hartw. 11. 1839.

Dry hillsides, Mexico and Puebla.

Slender shrub, 1 meter high, with reddish glabrous branches; leaflets 13 to 17, oblong or linear-oblong, 3 to 6 mm. long, glabrous; spikes 2 to 4 cm. long, 1.5 cm. thick; calyx silky-villous; petals rose or purple; fruit densely villous.

59. Parosela involuta Rydb. N. Amer. Fl. 24: 107. 1920.

Jalisco; type from Río Blanco.

Slender shrub, 1 meter high or more, with glabrous branches; leaflets 11 to 15, linear, 3 to 5 mm. long, glabrous; spikes dense, 2 to 4 cm. long, 1 cm. thick; calyx densely silky-pilose; petals pale rose or pink, or at first whitish; fruit densely pubescent.

60. Parosela eriophylla (S. Wats.) Rose, Contr. U. S. Nat. Herb. 10: 106. 1906.

Dalea eriophylla S. Wats. Proc. Amer. Acad. 17: 340. 1822.

Coahuila; type from the Sierra Madre, 40 miles south of Saltillo.

Shrub, 10 to 20 cm. high, with tomentose branches; leaflets 3, oblong or obovate-oblong, 3 mm. long, densely white-villous; spikes sessile, headlike; calyx densely villous; petals rose-colored.

61. Parosela greggii (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Dalea greggii A. Gray, Mem. Amer. Acad. II. 5: 314. 1854.

Parosela leucosericea Rydb. N. Amer. Fl. 24: 104. 1920.

Sonora to San Luis Potosí, Puebla, and Oaxaca; type from Buena Vista, Coahuila. Arizona.

Low shrub with tomentose-sericeous branches; leaflets 5 to 11, obovate or oval, 3 to 10 mm. long, densely sericeous-tomentose; spikes dense, 1 to 3 cm.

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long, 1 cm. thick; calyx silky-villous; petals rose-colored, or the banner yellowish; fruit densely villous above.

62. Parosela oaxacana Rose, Contr. U. S. Nat. Herb. **10**: 104. 1906.

Oaxaca; type from Sierra de San Felipe.

Shrub, 1 to 2 meters high, with finely soft-pubescent branches; leaflets 13 to 31, narrowly oblong, 6 to 9 mm. long, finely pubescent when young; spikes dense, 1 to 3 cm. long, 1 cm. thick; calyx silky-pubescent; petals rose-purple; fruit sparsely pubescent above.

63. Parosela tsugoides Rydb. N. Amer. Fl. **24**: 102. 1920.

Oaxaca; type from the Valley of Oaxaca. Guatemala.

Shrub, 1 meter high, with finely villous reddish branches; leaflets 13 to 23, oblong, 2 to 3 mm. long, pubescent; spikes 2 to 3 cm. long, 1 cm. thick; calyx densely pilose; petals dark purple; fruit pubescent.

64. Parosela versicolor (Zucc.) Rydb. N. Amer. Fl. **24**: 102. 1920.

Dalea versicolor Zucc. Flora **15**[2]: Beibl. 1: 69. 1832.

Oaxaca and Chiapas.

Shrub, 1 meter high, with villous branches; leaflets 15 to 21, oblong, 4 to 7 mm. long, glabrous above, finely pubescent beneath; spikes 3 to 5 cm. long, 1.5 cm. thick; calyx pilose; banner white or ochroleucous, the other petals rose-purple; fruit densely pubescent.

65. Parosela sessilis (A. Gray) Rydb. N. Amer. Fl. **24**: 104. 1920.

Dalea wislizeni sessilis A. Gray, Proc. Amer. Acad. **16**: 105. 1880.

Sonora to Durango. New Mexico (type locality) and Arizona.

Shrub, 0.5 to 1 meter high, with finely puberulent branches; leaflets 13 to 21, oblong, 2 to 3 mm. long, densely pubescent beneath, sparsely pilose or glabrate above; spikes 1 to 2.5 cm. long; calyx densely pilose; banner white or yellowish, the other petals rose colored; fruit densely pubescent.

66. Parosela megalostachys Rose; Rydb. N. Amer. Fl. **24**: 102. 1920.

Baja California; type from San Esteban.

Shrub, 1 meter high or more, with villous branches; leaflets 7 to 13, obovate, 8 to 10 mm. long, densely sericeous; spikes dense, 3 to 5 cm. long, 1.2 to 1.5 cm. thick; calyx densely silky-pilose; petals rose-colored; fruit villous.

67. Parosela wislizeni (A. Gray) Vail, Trans. N. Y. Acad. Sci. **14**: 34. 1894.

Dalea wislizeni A. Gray, Mem. Amer. Acad. II. **4**: 32. 1849.

Chihuahua to Durango and Guanajuato; type from the Sierra Madre west of Chihuahua.

Shrub, 0.5 to 1 meter high, with villous-canescent branches; leaflets 15 to 23, oblong, 3 to 6 mm. long, obtuse, densely villous-sericeous; spikes dense, 2 to 5 cm. long; calyx silky-villous; petals light rose or nearly white; fruit densely villous.

68. Parosela sanctae-crucis Rydb. N. Amer. Fl. **24**: 103. 1920.

Sonora and Chihuahua; type from Santa Cruz, Sonora. Arizona.

Shrub, 0.5 to 1 meter high, with short-pubescent branches; leaflets 13 to 15, oblong, 3 to 5 mm. long, short-pubescent beneath, pilose or glabrate above; spikes dense, 1 to 2 cm. long; calyx densely pilose; petals rose colored; fruit pilose above.

69. Parosela leucantha Rydb. N. Amer. Fl. **24**: 103. 1920.

Tepic and Jalisco; type collected in Tepic.

Shrub, 1 meter high, with finely short-pubescent branches; leaflets lance-oblong, 2 to 4 mm. long, acute, short-pubescent; spikes dense, 2 to 7 cm. long; calyx pilose; petals white; fruit densely pubescent above.

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70. Parosela benthami (T. S. Brandeg.) Standl.

Dalea benthami T. S. Brandeg. Proc. Calif. Acad. II. **2**: 148. 1889.

Dalea megacarpa biuncifera Greene; Vasey & Rose, Contr. U. S. Nat. Herb. **1**: 15. 1890.

Psorobatus benthami Rydb. N. Amer. Fl. **24**: 40. 1919.

Islands of the west coast of Baja California; type from Santa Margarita Island.

Shrub, 1 meter high or less, with white-tomentose branches covered with orange or brown glands; leaflets 7 to 11, suborbicular, 4 to 8 mm. long, white-tomentose; spikes 2 to 6 cm. long; calyx tomentose; petals pale yellow; fruit tomentose.

71. Parosela megacarpa (S. Wats.) Standl.

Dalea megacarpa S. Wats. Proc. Amer. Acad. **20**: 359. 1885.

Psorobatus megacarpus Rydb. N. Amer. Fl. **24**: 41. 1919.

Sonora (type locality) and Baja California.

Shrub, 1 meter high or less, with white-tomentose branches; leaflets 9 to 13, suborbicular, 5 to 8 mm. long, white-tomentose; spikes 5 to 15 cm. long, nearly 1 cm. thick; calyx tomentose; petals yellow, turning brown; fruit tomentose, 1 cm. long.

72. Parosela acutifolia (DC.) Rose, Bot. Gaz. **40**: 144. 1905.

Dalea acutifolia DC. Prodr. **2**: 245. 1825.

Morelos and Guerrero; type from Sierra Chilapa, Guerrero.

Shrub, 1 to 3 meters high, with glabrous branches; leaflets 7 to 11, elliptic or oval, 1 to 2.5 cm. long, cuspidate, glabrous; spikes rather lax, 5 to 15 cm. long; calyx silky-villous; petals at first greenish yellow, turning dark reddish purple; fruit silky-villous.

73. Parosela capitata (S. Wats.) Rose, Contr. U. S. Nat. Herb. **12**: 272. 1909.

Dalea capitata S. Wats. Proc. Amer. Acad. **25**: 146. 1890.

Chihuahua and Coahuila to San Luis Potosí; type from Carneros Pass, Coahuila.

Shrub, 30 to 50 cm. high, with finely puberulent branches; leaflets 5 to 9, obovate, 2 to 3 mm. long, emarginate; spikes dense, 1 to 3 cm. long; calyx sericeous; petals yellow; fruit finely pubescent.

74. Parosela quinqueflora (T. S. Brandeg.) Rydb. N. Amer. Fl. **24**: 84. 1920.

Dalea quinqueflora T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 180. 1911.

San Luis Potosí; type from Buena Vista.

Low shrub with glabrous branches; leaflets 5 or 7, cuneate-oblong, 3 mm. long; spikes headlike, 3 to 7-flowered; calyx sericeous; petals yellow.

75. Parosela lloydii Rydb. N. Amer. Fl. **24**: 84. 1920.

Known only from the type locality, Cedros, Zacatecas.

Low shrub with glabrous branches; leaflets 7 or 9, cuneate-oblong, 3 mm. long, glabrous; spikes 2 to 7-flowered; petals yellow.

76. Parosela mucronata (DC.) Rose, Contr. U. S. Nat. Herb. **10**: 103. 1906.

Dalea mucronata DC. Prodr. **2**: 246. 1825.

Jalisco and elsewhere in central Mexico.

Stems suffruticose, 0.5 to 1 meter high, glabrous; leaflets 7 to 27, elliptic, glabrous, cuspidate; spikes dense, 1 to 2.5 cm. long, 1 cm. thick; calyx glabrous; petals white; fruit glabrous.

77. Parosela lumholtzii (Robins. & Fern.) Vail, Bull. Torrey Club **26**: 117. 1899.

Dalea lumholtzii Robins. & Fern. Proc. Amer. Acad. **30**: 115. 1894.

Parosela arizonica Vail, Bull. Torrey Club **24**: 14. 1897.

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Sonora; type from Los Pinitos. Arizona.

Stems suffruticose, puberulent; leaflets 17 to 27, linear, 4 to 6 mm. long, obtuse, glabrous or sparsely sericeous when young; spikes dense, 1 cm. long or less; calyx sparsely sericeous; petals white; fruit densely pubescent above.

78. Parosela eysenhardtioides (Hemsl.) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea eysenhardtioides Hemsl. Diag. Pl. Mex. 6. 1878.

Michoacán to Oaxaca; type from Oaxaca.

Shrub, 2 to 4 meters high, with finely puberulent branches; leaflets 7 to 13, oblong-obovate or oblong-oblanceolate, 1 to 2 cm. long, mucronate; spikes dense, 1 to 3 cm. long, 6 to 7 mm. thick; petals white; fruit puberulent.

79. Parosela leucostachys (A. Gray) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea leucostachys A. Gray, Mem. Amer. Acad. II. 4: 32. 1849.

Chihuahua, Durango, and Jalisco; type from Cosihuiriachic, Chihuahua.

Shrub, 0.5 to 1 meter high, with puberulent or short-villous branches; leaflets 5 to 9, oblanceolate or obovate, obtuse or retuse; spikes 1 to 3 cm. long; calyx puberulent; petals white; fruit pubescent.

80. Parosela frutescens (A. Gray) Vail; Rose, Contr. U. S. Nat. Herb. 8: 303. 1905.

Dalea frutescens A. Gray, Bost. Journ. Nat. Hist. 6: 175. 1850.

Chihuahua, Coahuila, and Nuevo León. Texas (type from Guadalupe River) and New Mexico.

Slender shrub, 1 meter high or less, with glabrous branches; leaflets 13 to 17, obovate, 3 to 8 mm. long, retuse, glabrous; spikes dense, about 1 cm. long; calyx tube glabrous; petals purple; fruit glabrous.

81. Parosela hospes Rose, Contr. U. S. Nat. Herb. 12: 272. 1909.

Coahuila and Nuevo León; type collected near Monterrey, Nuevo León.

Slender shrub, 2 to 3 meters high, glabrous throughout, the branches purplish; leaflets 5 or 7, oblong or cuneate, 6 to 10 mm. long; spikes lax, 2 to 4 cm. long, 5 to 12-flowered; petals creamy white to pale purple; fruit sericeous.

82. Parosela pilosissima Rydb. N. Amer. Fl. 24: 91. 1920.

Known only from the type locality, near the city of Durango.

Shrub, 20 to 40 cm. high, the branches purplish, puberulent when young; leaflets 9 to 15, elliptic or oval, 2 to 4 mm. long, glabrous above, pilose beneath; spikes dense, 1 to 3 cm. long; calyx pubescent; petals blue; fruit slightly pubescent.

83. Parosela emoryi (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

Dalea emoryi A. Gray, Mem. Amer. Acad. II. 5: 315. 1854.

Psorothamnus emoryi Rydb. N. Amer. Fl. 24: 47. 1919.

Sonora and Baja California. Arizona (type from the Gila River) and southern California.

Shrub, 1 to 2 meters high, with white-velvety branches dotted with red or orange glands; leaflets 1 to 13, linear-oblong to obovate, 5 to 20 mm. long, white-velutinous; spikes dense, 1.2 to 1.5 cm. thick, 10 to 20-flowered; petals dark blue; fruit villous above.

This and related species were used by the Indians to dye baskets, giving a yellow or yellowish brown color.

84. Parosela scoparia (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 7. 1900.

Dalea scoparia A. Gray, Mem. Amer. Acad. II. 4: 32. 1849.

Psorothamnus scoparius Rydb. N. Amer. Fl. 24: 48. 1919.

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On sandhills, Chihuahua and Coahuila. New Mexico; type from the Jornada del Muerto.

Shrub, 0.5 to 1 meter high, with erect canescent branches; leaves 1 cm. long or less, linear or oblanceolate, canescent; spikes 1.2 to 1.5 cm. thick; calyx white-villous; petals dark blue; fruit pubescent.

85. **Parosela juncea** (Rydb.) Standl.

Psorothamnus junceus Rydb. N. Amer. Fl. 24: 48. 1919.

Known only from the type locality, Esperanza Canyon, San Pedro Mártir Mountains, Baja California.

Shrub with glabrous branches; leaflets 1 to 5, oblong or narrowly oblanceolate, 1 to 1.5 cm. long, glabrous; spikes subglobose, 1 cm. thick; petals dark blue.

86. **Parosela tinctoria** (T. S. Brandeg.) Standl.

Dalea tinctoria T. S. Brandeg. Proc. Calif. Acad. II. 2: 147. 1889.

Psorothamnus tinctorius Rydb. N. Amer. Fl. 24: 47. 1919.

Baja California; type from San Gregorio.

Shrub, 1 to 2 meters high, with gray branches; leaflets 3 or 5, 4 to 10 mm. long; spikes subglobose, 1 cm. thick; calyx villous; petals dark blue.

87. **Parosela dentata** (Rydb.) Standl.

Psorothamnus dentatus Rydb. N. Amer. Fl. 24: 47. 1919.

Known only from the type locality, Santo Domingo, Baja California.

Shrub with velutinous-canescent branches; leaflets 9 to 17, 1 to 2 cm. long, canescent; spikes subglobose, 1 cm. thick; petals dark blue.

88. **Parosela arenaria** (T. S. Brandeg.) Standl.

Dalea tinctoria arenaria T. S. Brandeg. Proc. Calif. Acad. II. 2: 147. 1889.

Psorothamnus arenarius Rydb. N. Amer. Fl. 24: 47. 1919.

Southern Baja California; type from Boca de Soledad.

Shrub, the branches glabrous or nearly so; leaflets 5 to 9, 1 to 3.5 cm. long, sparsely canescent; spikes short, 1 cm. thick; calyx silky-villous; petals blue; fruit pubescent.

89. **Parosela pectinata** (Kunth) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea pectinata Kunth, Mimos. Pl. Légum. 169. *pl. 49.* 1819.

Durango, Jalisco, and San Luis Potosí; type from Villapando.

Stems suffruticose, 0.5 to 1 meter high, glabrous; leaflets 41 to 65, linear, 2 to 4 mm. long, glabrous; spikes dense, 2 to 3 cm. long, 1 cm. thick; calyx silky-villous; petals blue or bluish purple; fruit short-villous.

90. **Parosela abietifolia** Rose; Rydb. N. Amer. Fl. 24: 92. 1920.

Known only from the type locality, mountains above Etzatlán, Jalisco.

Stems suffruticose, 30 to 40 cm. high, villous-tomentose; leaflets 31 to 35, 5 to 8 mm. long, short-villous; spikes 1 to 3 cm. long; calyx densely silky-villous; petals rose-purple; fruit densely villous.

91. **Parosela tomentosa** (Cav.) Rose, Contr. U. S. Nat. Herb. 12: 273. 1909.

Psoralea tomentosa Cav. Icon. Pl. 3: 21. *pl. 240.* 1794.

Dalea tomentosa Willd. Sp. Pl. 3: 1341. 1803.

Dalea verbenacea Schlecht. & Cham. Linnaea 5: 579. 1830.

Dalea argentea Don, Hist. Dichl. Pl. 2: 225. 1832.

Tepic and Jalisco to Veracruz and Guerrero.

Shrub, 1 meter high, with villous branches; leaflets 3 to 7, obovate, 8 to 12 mm. long, acute or mucronate, silky-villous; spikes dense, 1 to 3 cm. long, acute; calyx villous; petals purple or pink; fruit pubescent above.

92. **Parosela psoraleoides** (Moric.) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea verbenacea sericea Schlecht. Linnaea 5: 579. 1830.

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Dalea psoraleoides Moric. Mém. Soc. Genève 6: 533. *pl. 4.* 1833.

Jalisco to Veracruz and Guerrero; type from Cuernavaca, Morelos. Guatemala.

Shrub, 0.5 to 1.2 meters high, with villous branches; leaflets 5 to 9, oblong-obovate or elliptic, 5 to 10 mm. long, cuspidate, white-sericeous; spikes dense, 1 to 4 cm. long, 8 mm. thick; calyx villous; banner yellowish, the other petals pink, turning yellowish; fruit hairy at the summit.

93. Parosela hemsleyana Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea ramosissima Hemsl. Biol. Centr. Amer. Bot. 1: 245. 1880. Not *D. ramosissima* Mart. & Gal. 1843.

San Luis Potosí.

Shrub with glabrous branches; leaflets 9 to 15, oblong, 2 to 3 mm. long, obtuse, glabrous; spikes subcapitate; calyx sericeous; banner ochroleucous, the other petals purple; fruit densely pubescent.

94. Parosela trochilina (T. S. Brandeg.) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea trochilina T. S. Brandeg. Proc. Calif. Acad. II. 3: 200. 1892.

Southern Baja California; type from La Chuparosa.

Shrub, 1 to 1.5 meters high, the branches glabrous; leaflets 7 to 15, obovate, 3 to 5 mm. long, glabrous; spikes dense, 1 to 2 cm. long; calyx sericeous; banner ochroleucous, the other petals purple; fruit pubescent.

95. Parosela minutifolia Rydb. N. Amer. Fl. 24: 87. 1920.

Zacatecas to Oaxaca and Veracruz; type from Pachuca, Hidalgo.

Shrub, 50 cm. high, with glabrous branches; leaflets 7 or 9, 1 to 2 mm. long, glabrous; spikes 1 to 1.5 cm. long; calyx densely silky-pilose; banner ochroleucous, the other petals purple; fruit silky-villous.

96. Parosela naviculifolia (Hemsl.) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea naviculifolia Hemsl. Diag. Pl. Mex. 7. 1878.

Oaxaca.

Shrub, 30 to 50 cm. high, with puberulent branches; leaflets 11 to 21, oblong, 2 to 3 mm. long, obtuse, puberulent above; spikes dense, 1 to 3 cm. long, 8 mm. thick; calyx puberulent; banner white or ochroleucous, the other petals purple; fruit puberulent above.

97. Parosela argyrea (A. Gray) Heller, Cat. N. Amer. Pl. ed. 2. 5. 1900.

Dalea argyrea A. Gray, Pl. Wright. 1: 47. 1852.

Chihuahua and Nuevo León. Texas (type from San Pedro River) and New Mexico.

Shrub, 0.3 to 1 meter high, with tomentose branches; leaflets 7 to 13, obovate, 5 to 8 mm. long, sericeous; spikes dense, 1 to 2.5 cm. long; calyx silky-villous; banner yellowish, fading purplish, the other petals purple; fruit silky-villous.

98. Parosela seemanni (S. Wats.) Rose, Contr. U. S. Nat. Herb. 10: 106. 1906.

? *Dalea ehrenbergii* Schlecht. Linnaea 12: 290. 1838.

Dalea seemanni S. Wats. Proc. Amer. Acad. 22: 470. 1887.

Baja California to Zacatecas, Mexico, and Hidalgo; type from the Sierra Madre (Durango ?).

Shrub, 50 cm. high or more, the branches finely pubescent; leaflets 7 to 11, obovate or cuneate-oblong, sericeous; spikes rather dense, 2 to 5 cm. long; calyx long-villous; banner yellowish, the other petals purple.

99. Parosela tuberculata (Lag.) Rose, Contr. U. S. Nat. Herb. 10: 104. 1906.

Dalea tuberculata Lag. Gen. & Sp. Nov. 23. 1816.

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Dalea thymoides Schlecht. Linnaea 5: 580. 1830.

Dalea verrucosa Don, Hist. Dichl. Pl. 2: 225. 1832.

? *Dalea comosa* Schlecht. Linnaea 12: 289. 1838.

Chihuahua and Coahuila to Mexico and Puebla.

Shrub, 50 cm. high or more, the branches densely short-pubescent; leaflets 5 to 11, oblong or obovate, 4 to 8 mm. long, short-pubescent, sometimes glabrate above; spikes 2 to 15 cm. long; calyx short-pubescent; banner yellowish, the other petals purple; fruit pubescent. "Engorda-cabras" (Durango, *Patoni*).

100. Parosela canescens (Mart. & Gal.) Rose, Contr. U. S. Nat. Herb. 10: 105. 1906.

Dalea canescens Mart. & Gal. Bull. Acad. Brux. 10^2: 43. 1843.

Hidalgo, Puebla, and Oaxaca; type from Tehuacán, Puebla.

Shrub, 1 to 2 meters high, with finely canescent branches; leaflets 3 to 7, obovate, 4 to 10 mm. long, canescent, sometimes glabrate on the upper surface; spikes 2 to 10 cm. long; calyx short-pubescent; banner ochroleucous, the other petals purple; fruit pubescent.

101. Parosela conzattii Rydb. N. Amer. Fl. 24: 89. 1920.

Known only from the type locality, Cerro San Antonio, Oaxaca.

Low shrub with puberulent branches; leaflets 17 to 31, linear-oblong, 4 to 5 mm. long, glabrous above, puberulent beneath; spikes 2 cm. long; calyx pubescent; petals rose-purple.

102. Parosela tuberculina Rydb. N. Amer. Fl. 24: 89. 1920.

Known only from the type locality, San Luis Tultitlanapa, Puebla.

Low shrub with puberulent branches; leaflets 7 to 11, obovate, 4 to 5 mm. long, retuse, glabrous above, puberulent beneath; spikes dense, 1.5 to 3 cm. long; calyx short-pilose; banner yellowish, the other petals rose-purple; fruit densely pubescent.

103. Parosela fulvosericea Rydb. N. Amer. Fl. 24: 89. 1920.

Vicinity of San Luis Potosí.

Shrub, 50 cm. high, with villous branches; leaflets 7 or 9, obovate, 4 to 10 mm. long, retuse, sericeous; spikes dense, 2 to 3 cm. long; calyx sericeous; banner yellowish, the other petals rose-purple; fruit densely pubescent.

104. Parosela dorycnoides (DC.) Rydb. N. Amer. Fl. 24: 90. 1920.

Dalea dorycnoides DC. Prodr. 2: 245. 1825.

Dalea pulchella Moric. Mém. Soc. Genève 7: 249. *pl.* 7. 1836. Not *D. pulchella* Don, 1832.

? *Dalea argentea* Mart. Del. Sem. Hort. Monac. 1846. Not. *D. argentea* Don, 1832.

Parosela pulchella Heller, Cat. N. Amer. Pl. ed. 2. 6. 1900.

San Luis Potosí and Hidalgo.

Shrub, 50 cm. high or more, with tomentose branches; leaflets 5 or 7, obovate, 3 to 8 mm. long, retuse, silky-canescent; spikes headike, 1 to 2 cm. long; calyx villous; banner ochroleucous, the other petals purple; fruit pubescent.

105. Parosela polycephala (Benth.) Rydb. N. Amer. Fl. 24: 90. 1920.

Dalea polycephala Benth.; Hemsl. Biol. Centr. Amer. Bot. 1: 244, hyponym. 1880.

San Luis Potosí.

Low shrub with puberulent branches; leaflets 5 to 9, obovate, 2 mm. long or less, puberulent; spikes subglobose; calyx villous; banner yellowish, the other petals rose-purple; fruit pubescent.

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106. Parosela decora (Schauer) Rydb. N. Amer. Fl. 24: 90. 1920.

Dalea decora Schauer, Linnaea 20: 743. 1847.

Oaxaca.

Shrub, 0.3 to 1 meter high, with tomentose branches; leaflets 3 to 7, oblong or obovate, 2 to 5 mm. long, obtuse or retuse, villous-tomentose; spikes dense, headlike, 1 to 1.5 cm. long; calyx villous; banner white or ochroleucous, the other petals purple; fruit pubescent.

For a list of doubtful species of the genus see Rydberg, N. Amer. Fl. 24: 116. 1920.

14. HARPALYCE DC. Prodr. 2: 523. 1825.

Shrubs or small trees; leaves odd-pinnate, the leaflets rather large, with numerous yellowish or reddish glands on the lower surface; flowers large, racemose; fruit short and broad, bivalvate.

The writer is skeptical concerning the validity of the species listed below. They are separated usually by characters which would be considered of little value in other genera of the family and are represented by very few specimens.

The name "balché-ceh" is said by Seler to be applied to some species of the genus in Yucatán.

Leaflets glabrous on the upper surface, even when young.....1. H. goldmani.
Leaflets sericeous or puberulent on the upper surface, at least when young.
  Venation of the lower surface of the leaflets prominent and reticulate.
    Leaflets acutish or obtuse; valves of the fruit very thick and hard. 2. H. mexicana.
    Leaflets rounded and shallowy retuse at apex; valves of the fruit thin. 3. H. pringlei.
  Venation of the leaflets neither prominent nor reticulate.
    Leaflets oval or rounded-oval, finally glabrate beneath, retuse at apex. 4. H. arborescens.
    Leaflets oblong, copiously sericeous beneath, scarcely or not at all retuse at apex.
      Leaflets 7 or 9.....5. H. loeseneriana.
      Leaflets 13 to 23.....6. H. macrobotrya.

1. **Harpalyce goldmani** Rose, Contr. U. S. Nat. Herb. 8: 313. 1905.

Known only from the type locality, Canjob, Chiapas.

Leaflets 17 to 21, oblong or oblong-ovate, obtuse; racemes mostly longer than the leaves, the flowers large.

2. **Harpalyce mexicana** Rose, Contr. U. S. Nat. Herb. 8: 42. 1903.

Known only from the type locality, near Bolaños, Jalisco.

Small tree; leaflets 11 or 13, 4 to 7.5 cm. long; fruit 5.5 cm. long, 2.5 cm. wide, glabrous; seeds 10 to 14 mm. long, brown, lustrous.

3. **Harpalyce pringlei** Rose, Contr. U. S. Nat. Herb. 8: 42. 1903.

Known only from the vicinity of the type locality, Cuernavaca, Morelos.

Shrub, 0.3 to 1.8 meters high; leaflets about 11, 1.8 to 4 cm. long; fruit about 8 cm. long and 2.5 cm. wide.

4. **Harpalyce arborescens** A. Gray, Proc. Amer. Acad. 5: 178. 1862.

Brongniartia retusa Benth.; Hemsl. Diag. Pl. Mex. 8. 1878.

Brongniartia hidalgensis Taub. Bull. Herb. Boiss. 3: 613. 1895.

Harpalyce retusa Rose, Contr. U. S. Nat. Herb. 8: 43. 1903.

San Luis Potosí, Veracruz, and Hidalgo; type collected near Tantoyuca, Veracruz.

Shrub or small tree; leaflets 7 to 11, 2 to 5 cm. long.

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5. **Harpalyce loeseneriana** Taub. Bull. Herb. Boiss. 3: 612. 1895.
Harpalyce ferruginea T. S. Brandeg. Zoe 5: 234. 1906.
Puebla and Oaxaca; type from Mitla, Oaxaca.
Leaflets 2 to 4.5 cm. long; flowers 2.5 cm. long; fruit 8.5 cm. long, 3 cm. wide.

6. **Harpalyce macrobotrya** Harms, Verh. Bot. Ver. Brand. 51: 22. 1909.
Known only from the type locality, Distrito de Comitán, Chiapas.
Leaflets 2 cm. long or shorter; flowers 2 cm. long, red.

DOUBTFUL SPECIES.

HARPALYCE FORMOSA DC. Prodr. 2: 523. 1825. This, the type of the genus, was based upon one of Mociño and Sessé's drawings, but the tracing of the drawing seen by the writer is so imperfect that it is impossible to tell what species is represented. It may be the same as *H. pringlei* Rose.

15. BRONGNIARTIA H. B. K. Nov. Gen. & Sp. 6: 465. 1823.

Unarmed shrubs, usually small, with odd-pinnate leaves; flowers usually large, axillary, and long-pedunculate.

The plants vary greatly in pubescence at different stages of growth. Leaves that are densely sericeous at first may be almost glabrous when fully developed.

Stipules semireniform or semisagittate, much produced below the point of insertion.
- Leaflets 3 or 5; bracts longer than peduncles ..... 1. B. inconstans.
- Leaflets more than 5; bracts usually shorter than the peduncles.
  - Young branches pilose with soft spreading hairs.
    - Corolla about 2.5 cm. long ..... 2. B. lunata.
    - Corolla about 1.5 cm. long ..... 3. B. nudiflora.
  - Young branches glabrous or with appressed hairs.
    - Leaflets mostly 2.5 to 5 cm. long ..... 4. B. podalyrioides.
    - Leaflets mostly 1 to 2.5 cm. long ..... 5. B. mollicula.

Stipules oval to linear, not produced below the point of insertion.
- Leaflets linear, less than 1 mm wide ..... 6. B. minutifolia.
- Leaflets oblong or broader, much wider.
  - Young branches glabrous or practically so.
    - Flowers about 2 cm. long; leaflets 1 to 2 cm. long ..... 7. B. diffusa.
    - Flowers about 3 cm. long; leaflets 2 to 4 cm. long ..... 8. B. glabrata.
  - Young branches copiously pubescent.
    - Leaflets 3 or 5.
      - Leaflets 5, rounded or obtuse at apex, thin ..... 9. B. suberea.
      - Leaflets usually 3, emarginate, subcoriaceous ..... 10. B. trifoliata.
    - Leaflets 7 or more in all or most of the leaves.
      - Bractlets subtending the flowers glabrous.
        - Leaflets glabrous; bractlets cordate at base ..... 11. B. foliolosa.
        - Leaflets sericeous beneath when young; bractlets not cordate at base ..... 12. B. magnibracteata.
      - Bractlets pilose or sericeous.
        - Fruit densely pilose ..... 13. B. lasiocarpa.
        - Fruit glabrous.
          - Bracts at anthesis as long as the calyx ..... 14. B. lupinoides.
          - Bracts at anthesis much shorter than the calyx.
            - Calyx glabrous.
              - Leaflets acute, 2.5 to 5 mm. wide ..... 15. B. parvifolia.

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Leaflets rounded or obtuse at apex, 5 to 17 mm. wide.
Leaflets reticulate-veined, subcordate at base.
16. B. discolor.
Leaflets not reticulate-veined, rounded or obtuse at base.
Leaflets 14 to 17 mm. wide, broadly rounded or retuse at apex.....17. B. luisana.
Leaflets 5 to 8 mm. wide, obtuse at apex.
18. B. peninsularis.
Calyx copiously pilose or sericeous.
Venation of the lower surface of the leaflets very prominent and closely reticulate.....19. B. parryi.
Venation of the leaflets neither very prominent nor closely reticulate.
Pubescence of the peduncles retrorse.....20. B. goldmanii.
Pubescence of the peduncles spreading, ascending, or appressed.
Corolla 2.7 to 3 cm. long.....21. B. benthamiana.
Corolla less than 2.5 cm. long.
Leaflets 6 to 11 mm. long.....22. B. vicioides.
Leaflets 14 to 50 mm. long.....23. B. intermedia.

1. **Brongniartia inconstans** S. Wats. Proc. Amer. Acad. **22**: 404. 1887.
Jalisco and Michoacán; type from Tequila, Jalisco.
Glabrous shrub about a meter high; stipules very large, resembling the leaflets, these 1.2 to 5.5 cm. long, coriaceous, reticulate-veined, glaucescent beneath; flowers 3 cm. long, yellowish brown, turning purple.

2. **Brongniartia lunata** Rose, Contr. U. S. Nat. Herb. **5**: 194. 1899.
Known only from the type locality, east of Huasemote, Durango.
Leaflets 7 to 11, oval, 4 to 6 cm. long.

3. **Brongniartia nudiflora** S. Wats. Proc. Amer. Acad. **25**: 146. 1890.
Brongniartia palmeri Rose, Contr. U. S. Nat. Herb. **1**: 97. 1891.
Sonora to Jalisco; type from hills near Guadalajara.
Shrub, 45 to 90 cm. high; leaflets 7 to 15, 2.5 to 6 cm. long, copiously pilose, reticulate-veined; flowers purplish. "Haba de barranca" (Jalisco).

4. **Brongniartia podalyrioides** H. B. K. Nov. Gen. & Sp. **6**: 468. *pl. 588.* 1823.
? *Brongniartia bilabiata* Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 248. *pl. 1.* 1903.
Sonora to Guerrero and Morelos; type collected near La Punta de Ixtla, between Tasco and Cuernavaca, Morelos, altitude 900 meters.
Shrub, 1 meter high or less; leaflets about 11, elliptic or oval, glabrate in age; flowers 2.5 cm. long; fruit 2.5 cm. wide or narrower, glabrous, glaucescent.
B. galegoides Presl,[1] probably a Mexican plant, is closely related to this species.

5. **Brongniartia mollicula** T. S. Brandeg. Univ. Calif. Publ. Bot. **3**: 380. 1909.
Oaxaca and Puebla; type from San Luis Tultitlanapa, Puebla.
Leaflets 7 or 9, oval or suborbicular, bright green; flowers 2 to 2.5 cm. long.

6. **Brongniartia minutifolia** S. Wats. Proc. Amer. Acad. **20**: 360. 1885.
Brongniartia minutifolia canescens S. Wats. Proc. Amer. Acad. **23**: 271. 1888.
Chihuahua. Western Texas; type from Chisos Mountains.
Shrub, 0.3 to 1 meter high; leaflets numerous, linear, 2 to 4 mm. long; flowers 1 cm. long; fruit 1.5 cm. long, 1 cm. wide.
The Chihuahua plant is *B. minutifolia canescens.*

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[1] Symb. Bot. **2**: 21. *pl. 67.* 1833.

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7. Brongniartia diffusa Rose, Contr. U. S. Nat. Herb. **5**: 194. 1899.

Known only from the type locality, between Pedro Paulo and San Blascito, Tepic.

Slender shrub, about a meter high; leaflets 7 to 19, oval or rounded-oval, bright green; flowers purplish, 2 cm. long; fruit glabrous.

8. Brongniartia glabrata Hook. & Arn. Bot. Beechey Voy. 238. 1836.

Brongniartia bracteolata Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 249. *pl.* 2. 1903.

Sinaloa to Guerrero.

Slender shrub, 2 meters high or less, with green branches; leaflets 5 to 11, elliptic to suborbicular, bright green, glabrate; flowers 2.5 cm. long or larger; fruit 7 to 8 cm. long, 1.5 cm. wide. "Hierba de víbora" (Sinaloa).

Bark and leaves used in Sinaloa as a remedy for rattlesnake bites.

It is possible that *B. bracteolata* is a distinct species, but the material at hand does not show any important differences.

9. Brongniartia suberea Rose, Contr. U. S. Nat. Herb. **5**: 134. *pl.* 13. 1897.

Known only from Acapulco, Guerrero, the type locality.

Shrub, 2.5 to 3.5 meters high, the young branches often with thick corky ridges; flowers brownish or purplish.

B. mollis H. B. K.,[1] the type from Quebrada de Zopilote, between Zumpango and Tasco, is closely related and may be the same species. The only difference is found in the larger number of leaflets (9 to 11) in the species earlier described.

10. Brongniartia trifoliata T. S. Brandeg. Zoe **5**: 105. 1901.

Southern Baja California.

Spreading shrub, 2 to 4 meters high; leaflets 2.5 to 5.5 cm. long and nearly as wide, pale; fruit about 3.5 cm. long and 2 cm. wide.

11. Brongniartia foliolosa Benth.; Hemsl. Diag. Pl. Mex. 7. 1878.

Hidalgo and Puebla; type from Zimapán, Hidalgo.

Slender shrub, 1.5 to 2.5 meters high; leaflets about 25, oval, 4 to 10 mm. long, bright green, thick; fruit glabrous.

12. Brongniartia magnibracteata Schlecht. Linnaea **12**: 338. 1838.

Veracruz and probably elsewhere; type from San Bartolo.

Slender shrub, 1 to 2 meters high; leaflets about 33, oblong or oval, 1 to 2 cm. long, bright green; flowers purplish, nearly 2 cm. long; fruit glabrous, 4 cm. long, 1.8 cm. wide.

Judging from the description, *B. stipitata* Hemsl.[2] is closely related to this species, if not synonymous with it.

13. Brongniartia lasiocarpa Rose, Contr. U. S. Nat. Herb. **12**: 268. 1909.

Puebla; type from Tehuacán.

Shrub, 30 to 40 cm. high or larger; leaflets 15 to 19, broadly oval, 4 to 7 mm. long, thick, bright green, pilose, reticulate-veined flowers 1.5 cm. long.

14. Brongniartia lupinoides (H. B. K.) Standl.

Peraltea lupinoides H. B. K. Nov. Gen. & Sp. **6**: 471. *pl.* 589. 1823.

Peraltea oxyphylla DC. Mém. Légum. 463. 1825.

Brongniartia thermoides Spreng.; Steud. Nom. Bot. **1**: 230. 1840.

Brongniartia oxyphylla Hemsl. Biol. Centr. Amer. Bot. **1**: 254. 1880.

Guanajuato to Guerrero and Oaxaca; type collected between Chilpancingo and Zumpango, Guerrero.

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[1] Nov. Gen. & Sp. **6**: 467. *pl.* 587. 1823.

[2] Diag. Pl. Mex. 8. 1878.

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Shrub, 1 to 2.5 meters high; leaflets about 17, oblong or oval, 2 to 4 cm. long, densely sericeous, at least when young; flowers purple, 2.5 cm. long, very showy; fruit 5 to 7 cm. long, 2 to 3 cm. wide. "Janacahuate" (Jalisco, *Urbina*); "jaboncillo" (Guanajuato).

The fruit is nearly sessile in this species. A specimen from Guerrero differs in having stipitate fruit, but it is doubtful whether this is a specific character.

15. **Brongniartia parvifolia** Rose, Contr. U. S. Nat. Herb. 12: 268. 1909.

Known only from the type locality, between San Gerónimo and La Venta, Oaxaca.

Low shrub, about 30 cm. high; leaflets about 35, oblong or elliptic, 5 to 10 mm. long, pilose; flowers small, dark red; fruit 3.5 cm. long, nearly 1.5 cm. wide.

16. **Brongniartia discolor** T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 272. 1912.

San Luis Potosí and Veracruz to Puebla; type from Bagre, San Luis Potosí.

Leaflets 11 to 27, 1 to 1.7 cm. long; flowers 1.5 cm. long.

17. **Brongniartia luisana** T. S. Brandeg. Univ. Calif. Publ. Bot. 3: 381. 1909.

Known only from the type locality, San Luis Tultitlanapa, Puebla.

Slender shrub; leaflets oval, 2 to 3 cm. long, thin, bright green, sericeous beneath.

18. **Brongniartia peninsularis** Rose, Contr. U. S. Nat. Herb. 12: 268. 1909.

Known only from the type locality, southwest of El Potrero, Baja California, altitude 450 meters.

Shrub, 2 to 3 meters high, with pale crooked branches; leaflets 11 to 15, ovate to oval, 1.5 to 2.2 cm. long; flowers 1.7 cm. long.

19. **Brongniartia parryi** Hemsl. Biol. Centr. Amer. Bot. 1: 254. 1880.

San Luis Potosí (type locality), Guanajuato, and Querétaro.

Shrub; leaflets about 15, oblong or ovate-oblong, 1.5 to 4.5 cm. long, pale green, pubescent; fruit 3.5 to 7 cm. long, 2 to 3 cm. wide. "Garbancillo" (Querétaro).

20. **Brongniartia goldmanii** Rose, Contr. U. S. Nat. Herb. 12: 269. 1909.

Known only from the type locality, between Las Flechas and La Rastra, Sinaloa.

Shrub, 2 to 3 meters high; leaflets about 7, oval, 1 to 2.5 cm. long, bright green; flowers 2 to 2.5 cm. long.

21. **Brongniartia benthamiana** Hemsl. Biol. Centr. Amer. Bot. 1: 252. 1880.

Guanajuato, Hidalgo, and Mexico; type from León, Guanajuato.

Shrub a meter high or less; leaflets about 19, oval or oblong, 1.5 to 2.5 cm. long; fruit 4 to 6 cm. long, 1.7 to 2.5 cm. wide.

22. **Brongniartia vicioides** Mart. & Gal. Bull. Acad. Brux. 10^2: 49. 1843.

Puebla and Oaxaca; type from Misteca Alta and Cerro de San Felipe, Oaxaca.

Low shrub; leaflets 13 to 21, oval or broadly oblong, bright green on the upper surface, densely sericeous beneath.

23. **Brongniartia intermedia** Moric. Mém. Soc. Phys. Hist. Nat. Genève 7: 253. *pl. 10.* 1836.

Brongniartia sericea Schlecht. Linnaea 12: 337. 1838.

Brongniartia revoluta Rose, Contr. U. S. Nat. Herb. 12: 269. 1909.

San Luis Potosí to Jalisco and Oaxaca.

Shrub 1 meter high or less; leaflets 11 to 37, oblong or oval, densely sericeous when young; fruit 4 to 6 cm. long, 1.5 to 2.2 cm. wide, often glaucescent.

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DOUBTFUL SPECIES.

BRONGNIARTIA GRACILIS Hemsl. Biol. Centr. Amer. Bot. 1: 253. 1880. Described from Mexico, the exact locality not known.

BRONGNIARTIA OLIGOSPERMOIDES Baill. Adansonia 9: 240. 1868–70. Type from Xochialco.

16. BARBIERIA DC. Mém. Légum. 241. 1825.

1. **Barbieria pinnata** (Pers.) Baill. Hist. Pl. 2: 263. 1870.
   Galactia pinnata Pers. Syn. Pl. 2: 302. 1807.
   Clitoria polyphylla Poir. in Lam. Encycl. Suppl. 2: 309. 1811.
   Barbieria polyphylla DC. Mém. Légum. 242. 1825.

Southern Mexico, the exact localities not known, but probably in Veracruz or Oaxaca or both. Greater Antilles, Central America, and South America.

Shrub, 0.5 to 4 meters high, erect or scandent; leaves odd-pinnate, with numerous oblong leaflets; flowers red, about 5.5 cm. long, racemose; fruit linear, hirsute. "Enredadera" (Porto Rico).

17. CRACCA L. Sp. Pl. 752. 1753.

Low unarmed shrubs; leaves pinnate, the leaflets usually numerous but sometimes only 1 or 3, commonly with numerous close parallel lateral nerves; flowers small or large, racemose; fruit linear, flat, bivalvate.

Many of the Mexican plants of this genus are probably to be classed as herbs rather than shrubs, although most of them are inclined to be suffrutescent, at least at the base. All the Mexican species except one which, so far as known, is always a herbaceous annual, are included in the present treatment. Most of the species have very tough stems, which are broken with difficulty. *Cracca virginiana* L., of the United States, a herbaceous species, was used by the Indians of the Southeastern States to poison fish. It is said also to have diaphoretic and powerful anthelmintic properties.

Leaflets densely tomentose beneath, very obtuse at apex, large, 1 to 5 or rarely 7.
- Leaflets 5 or 7 ..... 1. C. lanata.
- Leaflets usually 1 or 3, the lateral ones, when present, often much reduced.
  - Calyx long-pilose; leaflet one, oval or broadly oblong ..... 2. C. platyphylla.
  - Calyx short-pilose; leaflets usually 3, oblong.
    - Calyx about 2 cm. long ..... 3. C. diversifolia.
    - Calyx about 1 cm. long ..... 4. C. micheliana.

Leaflets sericeous or glabrate beneath, or rarely short-pilose but then acute.
- Leaflets nearly or quite as broad as long ..... 5. C. potosina.
- Leaflets much longer than broad.
  - A. Leaflets rounded or very obtuse at base.
    - Leaflets 1 to 7, glabrous or densely white-sericeous beneath.
      - Leaflets densely white-sericeous beneath ..... 6. C. watsoniana.
      - Leaflets glabrous beneath ..... 7. C. madrensis.
    - Leaflets more than 7 in all or most of the leaves, or if fewer neither glabrous nor densely white-sericeous beneath.
      - Pubescence of the stems closely appressed.
        - Fruit pubescent.
          - Pubescence of the stems closely appressed; leaflets 3 to 4 cm. long. ..... 8. C. rhodantha.
          - Pubescence of the stems often partly spreading; leaflets 1.5 to 2.6 cm. long ..... 17. C. leucantha.
        - Fruit glabrous, at least on the sides.
          - Fruit glabrous on the edges; leaflets 2.5 to 4 cm. long. ..... 9. C. leiocarpa.

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Fruit strigillose on the edges; leaflets 1.5 to 2.5 cm. long. 10. C. cuernavacana.

Pubescence of the stems spreading or reflexed.

Leaflets 5 to 9 or rarely 11, 1.4 to 2.5 cm. wide.

Leaflets obtuse, glabrate beneath ..... 11. C. tepicana.

Leaflets acute, densely pilose beneath ..... 12. C. langlassei.

Leaflets more than 9 in all or most of the leaves, usually much more numerous, commonly less than 1.4 cm. wide.

Keel of the corolla about 1 cm. long. Leaflets 0.8 to 1.5 cm. long, glabrous on the upper surface ..... 13. C. seemanni.

Keel of the corolla much more than 1 cm. long.

Leaflets 0.6 to 1.2 cm. long ..... 22. C. pringlei.

Leaflets 1.5 to 4 cm. long or longer.

Pubescence of the stems brown; leaflets acute, 3.5 cm. long. 14. C. submontana.

Pubescence of the stems white to yellow; leaflets obtuse, or if acute less than 3.5 cm. long.

Fruit 6 to 7 mm. wide, thick, densely long-pilose. 15. C. talpa.

Fruit 3 to 5 mm. wide, flat, short-pilose or sericeous.

Corolla 2.5 to 3 cm. long ..... 16. C. macrantha.

Corolla 2 cm. long or shorter.

Leaflets small, 1.5 to 2.6 cm. long ..... 17. C. leucantha.

Leaflets large, most of them 3 to 5 cm. long or longer.

Calyx lobes subulate-attenuate ..... 18. C. toxicaria.

Calyx lobes triangular or oblong, acute or subobtuse. 19. C. schiedeana.

AA. Leaflets acute or cuneate at base.

Pubescence of the stems spreading or ascending, never closely appressed.

Leaflets broadest near the apex.

Flowers about 2 cm. long; leaflets 3 to 8 cm. long, glabrous on the upper surface ..... 20. C. nitens.

Flowers 8 to 12 mm. long; leaflets 6 to 20 mm. long, usually sericeous on the upper surface ..... 21. C. cinerea.

Leaflets broadest at or near the middle.

Flowers 2 cm. long ..... 22. C. pringlei.

Flowers less than 1 cm. long.

Leaflets appressed-pilose on the upper surface ..... 23. C. brandegei.

Leaflets glabrous on the upper surface ..... 24. C. vicioides.

Pubescence of the stems closely appressed.

Fruit glabrous ..... 9. C. leiocarpa.

Fruit sericeous or strigillose.

Leaflets oblanceolate or obovate, broadest near the apex. 21. C. cinerea.

Leaflets linear to linear-oblong, broadest at the middle.

Flowers 5 to 7 mm. long ..... 25. C. purpurea.

Flowers 11 to 18 mm. long ..... 26. C. palmeri.

1. **Cracca lanata** (Mart. & Gal.) Kuntze, Rev. Gen. Pl. 1: 175. 1891.

Tephrosia lanata Mart. & Gal. Bull. Acad. Brux. 10^2: 48. 1843.

Tephrosia crassifolia Benth. Bot. Voy. Sulph. 80. 1844.

Cracca crassifolia Kuntze, Rev. Gen. Pl. 1: 174. 1891.

Veracruz to Tepic and Guerrero; type from Zacuapan, Veracruz.

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Low shrub; leaflets oblong or oval, 4 to 8 cm. long, coriaceous; flowers 2 to 2.5 cm. long, purplish; fruit tomentose.

2. **Cracca platyphylla** Rose, Contr. U. S. Nat. Herb. **12**: 270. *f. 25*. 1909.

Known only from the type locality, pine woods between Mascota and San Sebastián, Jalisco.

Low shrub; leaflet one, oval-oblong to broadly oval, 5 to 7 cm. wide, broadly rounded at apex, coriaceous, white-tomentose beneath; flowers large, rose-red.

3. **Cracca diversifolia** Rose, Contr. U. S. Nat. Herb. **12**: 270. 1909.

Michoacán; type from Uruapam.

Shrub 0.5 to 1 meter high; leaflets 3, green on the upper surface, densely white-tomentose beneath, the lateral ones smaller than the terminal one; flowers violet, 2.5 cm. long; fruit very densely pilose.

4. **Cracca micheliana** Standl.

Tephrosia major Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 251. *pl. 4*. 1903.

Cracca major Rose, Contr. U. S. Nat. Herb. **12**: 270. 1909. Not *C. major* Alef. 1861.

Known only from the type locality, El Ocote, Michoacán or Guerrero.

Shrub about a meter high; leaflets sometimes 16 cm. long and 6 cm. wide; flowers white tinged with violet; fruit densely tomentose.

5. **Cracca potosina** (T. S. Brandeg.) Standl.

Tephrosia potosina T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 272. 1912.

Nuevo León and San Luis Potosí; type from Rascón, San Luis Potosí.

Plants chiefly herbaceous, decumbent; leaflets usually 5, suborbicular, 2 to 4 cm. long, sericeous beneath; fruit densely pilose.

This plant has been reported from Mexico as *Tephrosia lindheimeri* A. Gray, but it seems quite distinct from that species.

6. **Cracca watsoniana** Standl.

Clitoria sericea S. Wats. Proc. Amer. Acad. **22**: 407. 1887.

Cracca sericea Rose, Contr. U. S. Nat. Herb. **12**: 271. 1909. Not *C. sericea* A. Gray, 1883.

Tepic to Guerrero; type from Río Blanco, Jalisco.

Plants 45 cm. high or less, woody at base; leaflets 1 or sometimes 5 or 7, linear-oblong to oval, 3 to 8 cm. long, densely white-sericeous beneath; flowers purple, 2 to 2.5 cm. long.

7. **Cracca madrensis** (Seem.) Kuntze, Rev. Gen. Pl. **1**: 175. 1891.

Tephrosia madrensis Seem. Bot. Voy. Herald 280. *pl. 61*. 1856.

Known only from the type locality, somewhere in the Sierra Madre.

Leaves unifoliolate.

8. **Cracca rhodantha** (T. S. Brandeg.) Rose, Contr. U. S. Nat. Herb. **12**: 270. 1909.

Tephrosia rhodantha T. S. Brandeg. Zoe **5**: 201. 1905.

Sinaloa; type from Cofradía.

Slender shrub, 0.4 to 1.8 meters high, or often herbaceous nearly throughout; leaflets numerous, narrowly oblong; flowers brick-red or purplish white.

9. **Cracca leiocarpa** (A. Gray) Kuntze, Rev. Gen. Pl. **1**: 175. 1891.

Tephrosia leiocarpa A. Gray, Pl. Wright. **2**: 36. 1853.

Tephrosia affinis S. Wats. Proc. Amer. Acad. **21**: 424. 1886.

Tephrosia viridis Jones, Contr. West. Bot. **12**: 7. 1908.

Cracca affinis Rose, Contr. U. S. Nat. Herb. **12**: 269. 1909.

Chihuahua and Sonora to Jalisco; type collected along the Sonoita, in Sonora.

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Slender shrub, 0.6 to 2 meters high; leaflets about 17, narrowly oblong; flowers pinkish.

10. **Cracca cuernavacana** Rose, Contr. U. S. Nat. Herb. 12: 269. 1909.

Known only from the type locality, wooded slopes of barranca above Cuernavaca, Morelos, altitude 1,800 meters.

Slender suffrutescent plant, 0.6 to 1 meter high; leaflets oblong, obtuse, bright green; flowers 1.5 cm. long.

11. **Cracca tepicana** Standl. Contr. U. S. Nat. Herb. 20: 217. 1919.

Known only from Tepic, the type locality.

Leaflets oblong or oval-oblong, obtuse, green; flowers 1.5 cm. long.

12. **Cracca langlassei** (Micheli) Rose, Contr. U. S. Nat. Herb. 12: 270. 1909.

Tephrosia langlassei Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 250. *pl. 3.* 1903.

Jalisco to Oaxaca; type from the Sierra Madre of Michoacán or Guerrero.

Plants copiously pubescent; leaflets oblong-ovate, 3 to 6 cm. long; flowers 1.5 cm. long.

The specimens from Jalisco are slightly different from the more southern plant, and may represent a different species.

13. **Cracca seemanni** Britten & Baker, Journ. Bot. Brit. & For. 38: 17. 1900.

Sinaloa and perhaps elsewhere; type from somewhere in the Sierra Madre.

Plants suffrutescent, with purplish flowers. "Gallitos" (Sinaloa).

This has been reported from Mexico as *Tephrosia virginiana* (L.) Pers.

14. **Cracca submontana** Rose, Contr. U. S. Nat. Herb. 8: 46. 1903.

Sinaloa and Tepic; type collected between Pedro Paulo and San Blascito, Tepic.

Leaflets coriaceous, bright green on the upper surface and scaberulous; flowers about 2.5 cm. long.

15. **Cracca talpa** (S. Wats.) Rose, Bot. Gaz. 40: 143. 1905.

Tephrosia talpa S. Wats. Proc. Amer. Acad. 22: 405. 1887.

Sinaloa and Durango to Veracruz and Oaxaca; type from Río Blanco, Jalisco.

Plants herbaceous or suffrutescent; leaflets oblong or oval, 2 to 6 cm. long, densely sericeous; flowers pink, 1.5 to 2 cm. long.

This species is closely related to *C. toxicaria*, but has much broader, thicker fruit, and the leaflets are usually proportionally broader.

16. **Cracca macrantha** (Robins. & Greenm.) Rose, Bot. Gaz. 40: 143. 1905.

Tephrosia macrantha Robins. & Greenm. Proc. Amer. Acad. 29: 383. 1894.

Jalisco to Guerrero; type from Tequila, Jalisco.

Slender shrub, 2.5 to 3.5 meters high; leaflets oblong, 2 to 4 cm. long; flowers large, white or pink, in long racemes.

17. **Cracca leucantha** (H. B. K.) Kuntze, Rev. Gen. Pl. 1: 175. 1891.

Tephrosia leucantha H. B. K. Nov. Gen. & Sp. 6: 460. *pl.* 577. 1823.

Tephrosia leucantha acuta Jones, Contr. West. Bot. 12: 7. 1908.

Chihuahua and Sonora to Guanajuato; type collected near Guanajuato.

Plants suffrutescent; leaflets numerous, oblong or narrowly oblong; flowers greenish white or pinkish; fruit 3 to 5.5 cm. long, 4 to 5 mm. wide.

18. **Cracca toxicaria** (Pers.) Kuntze, Rev. Gen. Pl. 1: 175. 1891.

Tephrosia toxicaria Pers. Syn. Pl. 2: 328. 1807.

Tephrosia multifolia Rose, Contr. U. S. Nat. Herb. 1: 320. 1895.

Cracca multifolia Rose, Contr. U. S. Nat. Herb. 12: 270. 1909.

Sinaloa to Zacatecas and Oaxaca. Central America, West Indies, and South America.

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Shrub, 1 to 2 meters high, or often herbaceous; leaflets numerous, oblong or narrowly oblong; flowers white and pink, 1.5 to 2 cm. long. "Barbasco" (Jalisco, Oaxaca, Colombia); "chilapate" (El Salyador).

The roots have a disagreeable odor; in the West Indies they have been used in the treatment of cutaneous diseases. The plant is said also to have purgative properties and to affect the heart like digitalis. It is often crushed and throwr in water to poison fish. It is reported to furnish a fine blue dye.

19. Cracca schiedeana (Schlecht.) Standl.

Tephrosia schiedeana Schlecht. Linnaea 12: 299. 1838.

Jalisco to Oaxaca and Veracruz; type from Barranca de Tioselo, Veracruz. Guatemala.

Low shrub or herb; leaflets oblong or narrowly oblong, sericeous; flowers 2 greenish white or pinkish; fruit 3 to 5.5 cm. long, 4 to 5 mm. wide.

It is not certain that the specific name applies to the present plant, which seems distinct from *C. toxicaria*. It may be that *C. schiedeana* should be referred to the synonymy of that species.

20. Cracca nitens (Benth.) Kuntze, Rev. Gen. Pl. 1: 175. 1891.

Tephrosia nitens Benth.; Seem. Bot. Voy. Herald 107. *pl. 19*. 1853.

Michoacán to Chiapas. Central and South America; type from Panama.

Erect shrub 1 to 5 meters high; leaflets few, coriaceous, bright green above, densely sericeous beneath with lustrous hairs; flowers violet-red.

21. Cracca cinerea (L.) Morong, Ann. N. Y. Acad. 7: 79. 1892.

Galega cinerea L. Syst. Nat. ed. 10. 1172. 1759.

Tephrosia cinerea Pers. Syn. Pl. 2: 328. 1807.

Tephrosia decumbens Benth. Nat. For. Kjöbenhavn Vid. Medd. 1853: 7. 1854.

Tephrosia scopulorum T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 181. 1915.

Guerrero to Veracruz, Yucatán, and Oaxaca. Widely distributed in tropical America.

Plants decumbent, herbaceous or suffrutescent; flowers small, purplish or pink. "Barbasco" (Colombia); "añil," "añil cenizo" (Porto Rico).

The plant is said to have narcotic properties, and has been used in Guiana to stupefy fish. In the West Indies it is reputed to have medicinal properties, and has been used in the treatment of fevers and in nervous, cutaneous, and venereal diseases.

22. Cracca pringlei Rose, Bot. Gaz. 40: 143. 1905.

Oaxaca; type from Las Sedas.

Plants decumbent, suffrutescent; leaflets about 1 cm. long; flowers few, purple, 2 cm. long.

23. Cracca brandegei Standl. Contr. U. S. Nat. Herb. 20: 217. 1919.

Sinaloa and Durango; type from Altata, Sinaloa.

Leaflets linear or oblong-linear, 1 to 4.5 cm. long.

24. Cracca vicioides (Schlecht.) Kuntze, Rev. Gen. Pl. 1: 175. 1891.

Tephrosia vicioides Schlecht. Linnaea 12: 297. 1838.

Veracruz to Michoacán and Guerrero; type from Hacienda de la Laguna, Veracruz.

Plants herbaceous or suffrutescent, green and nearly glabrous; leaflets 2 to 3 cm. long; flowers small, wine-red, in very slender racemes.

25. Cracca purpurea L. Sp. Pl. 752. 1753.

Tephrosia purpurea Pers. Syn. Pl. 2: 329. 1807.

Tephrosia tenella A. Gray, Pl. Wright. 2: 36. 1853.

Cracca tenella Rose, Contr. U. S. Nat. Herb. 12: 271. 1909.

Baja California to Chihuahua, Veracruz, and Oaxaca. Widely distributed in the tropics of both hemispheres.

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Plants usually herbaceous but sometimes frutescent; flowers small, purple or purplish. "Afil" (Porto Rico).

Specimens of this species have been reported from Mexico as *Tephrosia leptostachya* DC. Maiden reports that the plant is harmful and even poisonous to stock. The plant is used in different countries for stupefying fish. Various medicinal properties are ascribed to it in India. An ointment made from the roots is applied for elephantiasis; the juice is applied to eruptions upon the skin, and a decoction of the roots is used for indigestion, coughs, liver and kidney affections, etc.

26. Cracca palmeri (S. Wats.) Rose, Contr. U. S. Nat. Herb. **12**: 270. 1909.

Tephrosia palmeri S. Wats. Proc. Amer. Acad. **24**: 46. 1889.

Tephrosia purisimae T. S. Brandeg. Proc. Calif. Acad. II. **2**: 149. 1889.

Tephrosia cana T. S. Brandeg. Proc. Calif. Acad. II. **3**: 126. 1891.

Baja California and Sonora; type from Guaymas, Sonora.

Plants slender, erect or decumbent, herbaceous or frutescent; leaflets 1.5 to 5.5 cm. long; flowers pink or purplish.

DOUBTFUL OR EXCLUDED SPECIES.

CRACCA OROBOIDES (H. B. K.) Kuntze, Rev. Gen. Pl. **1**: 175. 1891. *Tephrosia oroboides* H. B. K. Nov. Gen. Sp. **6**: 462. *pl. 579.* 1823. Apparently a species of *Lotus*.

CRACCA VENOSA (Mart. & Gal.) Kuntze, Rev. Gen. Pl. **1**: 175. 1891. *Tephrosia venosa* Mart. & Gal. Bull. Acad. Brux. **10**[2]: 47. 1843. Type from Oaxaca. The description suggests *C. pringlei* Rose, but the fruit is described as glabrous.

TEPHROSIA CHRYSOPHYLLA Mart. & Gal. Bull. Acad. Brux. **10**[2]: 40. 1843. Not *T. chrysophylla* Pursh, 1814. Type from Veracruz.

18. ROBINIA L. Sp. 722. 1753.

Trees or shrubs, usually armed with spines; leaves deciduous, pinnate; flowers in axillary racemes; fruit flat, bivalvate, narrowly winged along the upper suture.

Robinia pseudacacia L., the black locust, a native of the eastern United States, with white flowers, is cultivated as a shade tree in some localities. It is known usually as "acacia," and the name "loco" is said to be applied in Chihuahua.

Inflorescence glandular-hispid ..... 1. R. neomexicana.
Inflorescence puberulent or pilose, without glands ..... 2. R. pringlei.

1. Robinia neomexicana A. Gray, Mem. Amer. Acad. n. ser. **5**: 314. 1854.

Mountains of northern Sonora. Western Texas to Arizona and southern Colorado; type from the Mimbres River, New Mexico.

Very spiny tree or shrub, sometimes 7.5 meters high, with a trunk 35 cm. in diameter; bark thin, light brown, nearly smooth; leaflets 13 to 21, oval, about 4 cm. long; flowers large, showy, pale pink; fruit flat, densely hispid with gland-tipped hairs; wood very hard, strong, close-grained, yellow with brownish markings, the specific gravity about 0.80. "Uña de gato" (New Mexico).

2. Robinia pringlei Rose, Contr. U. S. Nat. Herb. **12**: 274. 1909.

Known only from the type locality, near Tula, Hidalgo, altitude 2,040 meters.

Medium-sized tree; leaflets 13 or 15, oval, 3.5 to 5 cm. long, thin, nearly glabrous; flowers large, in lax axillary racemes; fruit flat, 6 cm. long, 1 cm. wide, smooth, with 2 narrow wings along one edge.

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DOUBTFUL SPECIES.

ROBINIA EHRENBERGII Schlecht. Linnaea **12**: 303. 1838. Type from Aguascalientes, near Granada. Probably a species of *Lonchocarpus*.

ROBINIA MELANOCARPA Schlecht. Linnaea **12**: 305. 1838. Type from Papantla, Veracruz. Probably a *Lonchocarpus*.

19. DAUBENTONIA DC. Mém. Légum. 285. 1825.

1. Daubentonia cavanillesii (S. Wats.) Standl.

? *Aeschynomene longifolia* Cav. Icon. Pl. **4**: 8. *pl. 316*. 1797.

Sesban cavanillesii S. Wats. Proc. Amer. Acad. **17**: 342. 1882.

San Luis Potosí. Southern United States.

Shrub 1 to 2 meters high; leaves odd-pinnate, the leaflets numerous, pale, narrowly oblong, 1 to 2.5 cm. long, obtuse; flowers yellow, 1.5 to 2 cm. long, racemose; fruit with 4 longitudinal wings.

The seeds are said to have been used in the southern United States as a substitute for coffee.

20. SESBAN Adans. Fam. Pl. **2**: 327. 1763.

Unarmed shrubs or small trees or often herbs; leaves pinnate, the leaflets numerous, small; flowers racemose, large and showy; fruit linear, compressed, 4-angled, or subterete, often very long.

Corolla 6 to 7 cm. long. Leaflets oblong or oval----------**1. S. grandiflora.**
Corolla 2.5 cm. long or shorter.
Leaflets lanceolate to elliptic, acute; fruit stipitate, 8 mm. wide. **2. S. mexicana.**
Leaflets oblong or oval, rounded at the apex; fruit sessile, 3 to 4 mm. wide. **3. S. macrocarpa.**

1. Sesban grandiflora (L.) Pers. Syn. Pl. **2**: 316. 1807.

Aeschynomene grandiflora L. Sp. Pl. ed. 2. 1060. 1763.

Agati grandiflora Desv. Journ. de Bot. Desv. **1**: 120. 1813.

Adventive in Yucatán and sometimes cultivated for ornament. Native probably of the East Indies; adventive in tropical America.

Nearly glabrous shrub or small tree, sometimes 4.5 meters high; leaflets about 3 cm. long; flowers very large, white or pink, pendulous; fruit 30 to 35 cm. long. "Pico de flamingo" (Yucatán); "cobreque" (Nicaragua); "gallito," "báculo," or "cresta de gallo" (Porto Rico).

The wood is soft, weak, and light. From incisions in the stem there runs a pinkish white juice, which dries into vitreous tears of a violet tint. From these is obtained a gum from which two coloring principles have been separated—a red one, agathine, and a yellow one, xanthoagathine. The bitter bark is said to have tonic and febrifuge properties; in India it has been employed as a remedy for smallpox. Diuretic and laxative properties are ascribed to the leaves. In southern Asia the flowers and green pods are eaten as a salad or pot herb, and the leaves and young shoots are gathered and fed to cattle. For an illustration of the plant see Contr. U. S. Nat. Herb. **9**: *pl. 6*.

2. Sesban mexicana Pollard, Bull. Torrey Club **24**: 154. 1897.

Aeschynomene longifolia Orteg. Hort. Matr. Dec. **9**: 70. 1800. Not *A. longifolia* Cav. 1797.

Sesban longifolia DC. Prodr. **2**: 265. 1826.

Jalisco.

Low shrub; leaflets 1.5 to 3.5 cm. long, bright green; fruit 6.5 to 12.5 cm. long, conspicuously torulose.

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It is not at all certain that the name *Aeschynomene longifolia* Cav. does not apply to this plant. That species was based upon flowering specimens, and the leaves illustrated resemble those of *S. mexicana* quite as much as those of *Daubentonia cavanillesii*.

3. **Sesban macrocarpa** Muhl.; Ell. Bot. S. C. & Ga. **2**: 221. 1788.
Aeschynomene picta Cav. Icon. Pl. **4**: 7. *pl. 314*. 1797.
Sesban picta Pers. Syn. Pl. **2**: 316. 1807.
Usually along streams or in wet soil, Baja California and Sonora to Guerrero and Veracruz. Southern United States; Central America.
Shrub, 1 to 4.5 meters high; leaflets numerous, 1 to 3.5 cm. long, pale green; flowers large, yellow, racemose; fruit slender, 10 to 30 cm. long. "Zacate de agua" (Jalisco); "bequilla" (Sonora, *Palmer*).

21. BENTHAMANTHA Alef. Bonplandia **1862**: 264. 1862.

Unarmed herbs or low shrubs; leaves odd-pinnate, with 3 to many thin, rather small leaflets; flowers small, racemose; fruit linear, compressed, bivalvate.

Pedicels and rachis of the inflorescence glandular-pilose.
Leaflets sericeous on the upper surface ..... **1. B. glandulifera.**
Leaflets glabrous on the upper surface ..... **2. B. greenmanii.**
Pedicels and rachis without gland-tipped hairs.
Leaflets glabrous on the upper surface ..... **3. B. glabrescens.**
Leaflets pilose or sericeous on the upper surface ..... **4. B. mollis.**

1. **Benthamantha glandulifera** (Benth.) Alef. Bonplandia **1862**: 264. 1862.
Tephrosia glandulifera Benth. Pl. Hartw. 115. 1843.
Cracca glandulifera Benth. Nat. For Kjöbenhavn Vid. Medd. **1853**: 8. 1853.
Benthamantha glandulosa Rose, Contr. U. S. Nat. Herb. **10**: 99. 1906.
Chiapas. Central America and northwestern South America; type from Guayaquil, Ecuador.
Shrub, 60 cm. high, or sometimes herbaceous; leaflets about 13, oval, 1 to 2 cm. long, sericeous beneath; flowers purplish yellow, 1 cm. long.

2. **Benthamantha greenmanii** (Millsp.) Britt. & Baker; Millsp. Field Mus. Bot. **2**: 50. 1900.
Cracca greenmanii Millsp. Field Mus. Bot. **1**: 299. *pl. 13*. 1896.
Yucatán and Campeche; type from Chichen Itzá, Yucatán.
Plants low, suffrutescent or herbaceous.
The roots bear numerous tubers as in *B. glabrescens*. Probably these tubers are borne by all the members of the genus.

3. **Benthamantha glabrescens** (Benth.) Alef. Bonplandia **1862**: 264. 1862.
Tephrosia glabrescens Benth. Bot. Voy. Sulph. 81. 1844.
Cracca glabrescens Benth. Nat. For. Kjöbenhavn Vid. Medd. **1853**: 9. 1853.
Benthamantha pumila Rose, Contr. U. S. Nat. Herb. **10**: 99. *pl. 30*. 1906.
Benthamantha tuberosa T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 376. 1913.
Chihuahua to Puebla and Veracruz; reported from Nuevo León. Type from Colombia.
Plants decumbent, herbaceous or suffrutescent, bright green and glabrate; leaflets oval or rounded-oval, 0.5 to 2 cm. long.
The roots bear numerous tubers 1 to 10 cm. long, resembling small sweet potatoes.

4. **Benthamantha mollis** (H. B. K.) Alef. Bonplandia **1862**: 264. 1862.
Tephrosia mollis H. B. K. Nov. Gen. & Sp. **5**: 463. 1821.
Cracca mollis Benth. Nat. For. Kjöbenhavn Vid. Medd. **1853**: 4. 1853.
Cracca edwardsii A. Gray, Pl. Wright. **2**: 35. 1853.

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Cracca edwardsii sericea A. Gray, Proc. Amer. Acad. 17: 201. 1882.
Cracca sericea A. Gray, Proc. Amer. Acad. 19: 74. 1883.
Brittonamra sericea Kearney, Trans. N. Y. Acad. Sci. 14: 32. 1894.
Benthamantha sericea Britt. & Baker, Journ. Bot. Brit. & For. 38: 19. 1900.
Benthamantha fruticosa Rose, Contr. U. S. Nat. Herb. 8: 99. 1906.

Baja California to Chihuahua, Yucatán, and Chiapas. Southern Arizona; Central America and northern South America; type from Venezuela.

Slender shrub, 0.6 to 1.5 meters high, or often herbaceous; leaflets mostly oval, 1 to 3.5 cm. long; flowers small, yellow striped with brown or purple; fruit about 6 cm. long and 3.5 mm. wide.

A very variable species, with a wide range. It may be possible to divide it into two or more species, but no constant lines of separation are apparent. The pubescence of the stems is either appressed or spreading, in varying degrees. The earlier or larger leaves are often trifoliolate, while the upper leaves on the same plant are usually multifoliolate. The leaflets are often mottled with bronze and green. Specimens of this species have been reported from Yucatán as *Tephrosia cinerea* Pers. and as *Cracca cinerea* (Pers.) Morong.

The writer has seen no specimens of *B. caribaea* (Jacq.) Kuntze from Mexico, although it might be expected in Yucatán. It resembles *B. mollis*, but has much larger flowers.

22. DIPHYSA Jacq. Enum. Pl. Carib. 7. 1760.

Unarmed shrubs or small trees; leaves pinnate, the leaflets few, thin; flowers rather large, yellow, racemose; fruit inflated but compressed.

Some of the species—probably all of them—yield a yellow dye. The vernacular names "macano" and "cacique" are said to be applied in Panama to *D. carthaginensis* Jacq.

Inflorescence densely viscid-pubescent or covered with long, stout, spinelike hairs.
Inflorescence viscid-pubescent, without spinelike hairs.
Fruit 3 to 5 cm. long ..... 1. D. racemosa.
Fruit 6 to 11 cm. long ..... 2. D. macrocarpa.
Inflorescence scarcely or not at all viscid, covered with long spinelike hairs. 3. D. thurberi.
Inflorescence neither viscid-pubescent nor with spinelike hairs.
Racemes usually 1 or 2-flowered; leaflets 5 mm. long or shorter; branches puberulent ..... 4. D. minutifolia.
Racemes with few or numerous flowers; leaflets usually much more than 5 mm. long, or if small the branches glabrous.
Stipe of the fruit much longer than the calyx ..... 5. D. sennoides.
Stipe equaling or shorter than the calyx.
Pedicels with at least a few short hairs in anthesis; leaflets mostly 1.5 to 3 cm. long, bright green on the upper surface ..... 6. D. robinioides.
Pedicels wholly glabrous; leaflets mostly less than 1.5 cm. long, commonly grayish green.
Fruit less than 1.5 cm. wide ..... 7. D. suberosa.
Fruit 2 to 3 cm. wide ..... 8. D. occidentalis.

1. **Diphysa racemosa** Rose, Contr. U. S. Nat. Herb. 1: 97. *pl. 3.* 1891.

Sonora to Guerrero and Morelos; type from Alamos, Sonora.

Shrub, 1.5 to 3 meters high, very viscid; leaflets usually 9 to 17, oval or oblong, 0.5 to 2.5 cm. long, pale beneath; racemes long, numerous, the flowers about 2 cm. long; fruit about 4 cm. long and 1.5 cm. wide.

The plant has a disagreeable odor. The wood is hard and yellow.

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2. **Diphysa macrocarpa** Standl., sp. nov.

Type from Tecozantla, Hidalgo, collected by F. Salazar, May 22, 1914 (U. S. Nat. Herb. no. 1,039,091).

Branches, petioles, and inflorescence densely viscid-pubescent; leaflets 11 to 29, oval, 8 to 15 mm. long, glabrous, pale beneath; racemes lax, few-flowered; calyx glabrous, the lobes glandular-ciliate; fruit 6 to 11 cm. long, 1.2 to 1.5 cm. wide, obtuse or acute, short-rostrate, covered with sessile glands, the stipe about twice as long as the calyx, viscid-setulose. "Retama de cerro."

3. **Diphysa thurberi** (A. Gray) Rydb.

Daubentonia thurberi A. Gray, Mem. Amer. Acad. n. ser. 5: 313. 1855.

Diphysa echinata Rose, Contr. U. S. Nat. Herb. 12: 271. 1909.

Sonora and Sinaloa; type from Mabibi, Sonora. Southern Arizona.

Shrub; leaflets about 11, or more, oval or rounded-oval, 1 to 1.5 cm. long.

4. **Diphysa minutifolia** Rose, Contr. U. S. Nat. Herb. 12: 271. 1909.

Tamaulipas to Yucatán and Chiapas; type from Cuernavaca, Morelos.

Shrub, 1 to 2 meters high, rigidly branched, the branches gray or red; leaflets about 13, oval or oblong, bright green; flowers 1.5 cm. long. "Xsusuc" (Yucatán, Maya); "retama" (Tamaulipas).

5. **Diphysa sennoides** Benth. Nat. For. Kjöbenhavn Vid. Medd. 1853: 12. 1854.

Veracruz (type locality) and Hidalgo to Guerrero and Oaxaca. Reported from Guatemala and Venezuela.

Shrub 2 to 4 meters high; leaflets about 13; fruit very large, about 10 cm. long. "Cascabelillo" (Guerrero).

6. **Diphysa robinioides** Benth. Nat. For. Kjöbenhavn Vid. Medd. 1853: 11. 1854.

Diphysa floribunda Peyr. Linnaea 30: 78. 1859.

Veracruz to Yucatán, Chiapas, and Oaxaca. Central America; type from Nicaragua.

Shrub or small tree, sometimes 7.5 meters high; leaflets mostly 11 to 21, oval or oblong; flowers numerous, 1.5 cm. long; fruit about 6 cm. long and 1.5 to 2 cm. wide. "Cuachepil" (from the Nahuatl *cuau-chepilli*); "palo amarillo" (Guatemala); "guachipilín," "guachipelí," "huachipilín" (El Salvador, Costa Rica).

The wood is hard and durable; it yields a yellow dye. It is doubtful whether this species is distinct from *D. carthaginensis* Jacq., which was described from Cartagena, Colombia.

7. **Diphysa suberosa** S. Wats. Proc. Amer. Acad. 22: 405. 1887.

Sonora to Morelos and Oaxaca; type from Guadalajara.

Shrub 1 to 3 meters high; bark of the older branches forming thick, corky ridges; leaflets numerous, 5 to 15 mm. long. "Palo santo" (Jalisco).

The powdered bark is used in Jalisco as a remedy for catarrh. The flowers of this and the next species are smaller than in *D. robinioides*.

8. **Diphysa occidentalis** Rose, Contr. U. S. Nat. Herb. 12: 271. 1909.

Sonora to Guerrero; type from Guaymas, Sonora.

Shrub or tree, 1.5 to 8 meters high, the trunk sometimes 30 cm. in diameter.

DOUBTFUL SPECIES.

COLUTEA AMERICANA Mill. Gard. Dict. ed. 8. *Colutea* no. 5. 1768. Type from Veracruz.

23. **LENNEA** Klotzsch; Link, Klotzsch & Otto, Icon. Pl. Rar. 2: 65. 1842.

Unarmed shrubs or small trees; leaves pinnate, the leaflets large; flowers rather small, racemose; fruit flat, bivalvate, few-seeded.

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Inflorescence glabrous; standard about 7 mm. long; fruit glabrous. 1. **L. robinioides.**

Inflorescence densely brown-pilose with short appressed hairs; fruit densely pubescent ..... 2. **L. brunnescens.**

1. **Lennea robinioides** Klotzsch; Link, Klotzsch & Otto, Icon. Pl. Rar. 2: 65. *pl. 26.* 1842.

Veracruz; described from cultivated plants.

Slender glabrous shrub; leaflets usually 9 or 11, oval, 2.5 to 4 cm. long, thin, bright green; flowers purplish, in very slender axillary racemes; fruit linear.

2. **Lennea brunnescens** Standl., sp. nov.

Veracruz; type from Carrizal (*Goldman* 701; U. S. Nat. Herb. no. 397071).

Tree, 6 to 7.5 meters high, the branches grayish or brownish, when young densely pilose with short brownish ascending hairs; stipules subulate, 2 to 3 mm. long; leaf rachis 6 to 11 cm. long, the petiolules 1 to 2 mm. long; leaflets 13 or 15, oval, oval-oblong, or oval-obovate, 2 to 5.5 cm. long, 1 to 2.5 cm. wide, acutish to rounded at base, rounded or subretuse at apex, bright green and glabrous on the upper surface, with prominulous reticulate venation, beneath slightly paler, thinly sericeous with whitish or brownish hairs; racemes rather dense, 4 to 5 cm. long, the rachis and slender pedicels pilose with short brown hairs; calyx 3 mm. long, densely brown-pilose, the lower lobes triangular, acuminate; petals glabrous, the standard 8 to 9 mm. long; fruit flat, 5.5 to 7 cm. long, 1.2 to 1.4 cm. wide, obtuse at apex, gradually tapering to the base, densely pilose with minute appressed brown hairs.

Also collected at Baños del Carrizal, Veracruz, August, 1914, by C. A. Purpus (no. 6083). The Purpus collection is in fruit only and was distributed as "*Acacia?*" The only other Mexican species of the genus, *L. robinioides*, is represented in the National Herbarium by a single collection (*Purpus* 5891), from Misantla, Veracruz, which agrees well with the original description and plate. *L. robinioides* differs from the present plant in its lack of pubescence, less numerous leaflets, and smaller flowers. The flowers of *L. brunnescens* appear to have been greenish yellow, although of course their color may have changed in drying; those of *L. robinioides* are purplish.

24. COURSETIA DC. Ann. Sci. Nat. 4: 92. 1825.

Erect shrubs or trees, spiny or unarmed, pubescent; leaves pinnate, the leaflets small or large; flowers in axillary racemes; fruit linear, compressed, bivalvate.

In *C. glandulosa* as well as in other species the branches are often covered with a transparent, yellowish or brown gum or lac produced by insects. Palmer reports that in Sonora this is dissolved in water with sugar and used as a drink in colds and fevers, and that it is believed also to be a remedy for tuberculosis. It is sold in the drug shops as "goma Sonora" at about a peso per pound.

Inflorescence without glands or gland-tipped hairs.
- Leaflets 1.5 to 4 cm. long ..... 1. **C. polyphylla.**
- Leaflets less than 1 cm. long ..... 2. **C. axillaris.**

Inflorescence with numerous subsessile glands or gland-tipped hairs.
- Petioles flat and winged ..... 3. **C. planipetiolata.**
- Petioles subterete, not winged.
  - Rachis of the leaves pilose with long soft spreading hairs ..... 4. **C. mollis.**
  - Rachis of the leaves with short appressed hairs.
    - Corolla about 1 cm. long ..... 5. **C. glandulosa.**
    - Corolla about 2 cm. long ..... 6. **C. madrensis.**

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1. **Coursetia polyphylla** T. S. Brandeg. Univ. Calif. Publ. Bot. 4: 376. 1913.

Known only from the type locality, Baños del Carrizal, Veracruz.

Slender shrub, apparently unarmed; leaflets about 11, oval-oblong or oval-obovate; fruit 6 cm. long, 5 mm. wide, constricted between the seeds.

2. **Coursetia axillaris** Coult. & Rose, Bot. Gaz. 16: 180. 1891.

Tamaulipas. Southwestern Texas, the type from San Diego.

Densely branched shrub or small tree, unarmed; flowers white, 1 cm. long, solitary or in few-flowered racemes; fruit linear, 2 to 3.5 cm. long, slightly constricted between the seeds.

3. **Coursetia planipetiolata** Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 253. *pl. 5.* 1903.

Guerrero and Oaxaca; type from Río San Luis.

Shrub, about 2 meters high; leaflets oval or ovate, 3 to 5.5 cm. long; flowers pinkish white; fruit 5 to 7 cm. long, 6 mm. wide, brown.

4. **Coursetia mollis** Robins. & Greenm. Proc. Amer. Acad. 29: 384. 1894.

Sinaloa to Guerrero; type from the Barranca of Beltrán, Jalisco.

Densely pubescent shrub, 1 to 4 meters high, armed with very stout short spines; leaflets often as many as 31, oblong or oval, 1 to 2 cm. long; flowers in short long-pedunculate racemes, the standard purplish, the other petals pale yellow; fruit 7 cm. long and 7 mm. wide, scarcely at all constricted. "Garbancillo de la costa," "cucablanca" (Sinaloa).

5. **Coursetia glandulosa** A. Gray, Proc. Amer. Acad. 5: 156. 1862.

Coursetia microphylla A. Gray, Proc. Amer. Acad. 17: 201. 1882.

Baja California and Sonora to Guerrero; type from the vicinity of Cape San Lucas, Baja California.

Shrub or small tree, 1.5 to 6 meters high, unarmed; leaflets mostly oval, 1 cm. long or shorter; flowers pink, with yellow center, or white and yellow; fruit constricted between the seeds. "Samo prieto" (Sonora).

6. **Coursetia madrensis** Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 253. *pl. 6.* 1903.

Known only from the type locality, in the Sierra Madre of Michoacán or Guerrero.

Spiny shrub; leaflets oval, 1.5 cm. long, sericeous beneath; flowers blood-red with orange-yellow center.

DOUBTFUL SPECIES.

COURSETIA VIRGATA (Cav.) DC. Prodr. 2: 264. 1825. *Aeschynomene virgata* Cav. Icon. Pl. 3: 47. *pl. 293.* 1794. Type from New Spain. Scarcely of this genus.

25. OLNEYA A. Gray, Mem. Amer. Acad. n. ser. 5: 328. 1855.

1. **Olneya tesota** A. Gray, Mem. Amer. Acad. n. ser. 5: 328. 1855.

Dry plains and hillsides, Sonora and Baja California. Southern Arizona (type locality) and California.

Shrub or small tree, often only a meter high but sometimes attaining a height of 9 meters, with a trunk diameter of 45 cm.; branches armed with stiff sharp spines; bark thin, scaly, peeling off in long reddish brown strips; leaves odd-pinnate, the leaflets 11 to 15, 8 to 20 mm. long, grayish; flowers purplish white, showy, in short racemes; fruit glandular-hairy, with 1 to 5 or more seeds. "Palo fierro," "palo de hierro," "árbol de hierro," "tésota," "uña de gato."

The English name is "ironwood." Wood hard, strong but brittle, dark brown, the specific gravity about 1.15; difficult to work, but sometimes used, and valued for firewood. The Indians of Arizona and northwestern Sonora grind the

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roasted beans and use them for making "pinole." The tree is mentioned by Clavigero (Historia de la California, 1789) as "palo hierro."

26. GLIRICIDIA H. B. K. Nov. Gen. & Sp. **6**: 393. 1823.

Trees with pinnate leaves; leaflets estipellate, usually blotched beneath; flowers in axillary racemes, pink or purplish; fruit stipitate, broadly linear, exalate, bivalvate.

Leaflets rounded at apex, densely sericeous beneath when young with long hairs; flowers about 1.5 cm. long ..... **1. G. guatemalensis.**

Leaflets mostly acute, glabrate beneath or sparsely strigose with very short hairs; flowers about 2.5 cm. long ..... **2. G. sepium.**

1. Gliricidia guatemalensis Micheli, Bull. Herb. Boiss. **2**: 442. *pl. 10.* 1894.

Oaxaca. Guatemala; type from Sacabajá.

Leaflets 11 to 17, oval, 1.5 to 3.5 cm. long, blotched beneath with bronze or purple; flowers long-pediceled, in lax racemes.

2. Gliricidia sepium (Jacq.) Steud. Nom. Bot. ed. 2. **1**: 688. 1841.

Robinia sepium Jacq. Enum. Pl. Carib. 28. 1760.
Gliricidia maculata H. B. K. Nov. Gen. & Sp. **6**: 393. 1823.
Robinia maculata H. B. K. Nov. Gen. & Sp. **6**: 393. 1823.
Lonchocarpus maculatus DC. Prodr. **2**: 260. 1825.
Robinia variegata Schlecht. Linnaea **12**: 301. 1838.
Gliricidia lambii Fernald, Bot. Gaz. **20**: 533. 1895.

Sinaloa to Veracruz, Yucatán, and Chiapas. Central America and northern South America; naturalized in the West Indies and Philippines; type from Cartagena, Colombia.

Tree, 3 to 9 meters high or larger, the trunk usually short and crooked; bark grayish, smooth or shallowly fissured; leaflets ovate or elliptic, 3.5 to 6.5 cm. long, acute, green above, pale beneath and usually blotched with bronze; flowers 2.5 cm. long, in clustered racemes, bright pink; fruit long, flat, 1.5 cm. wide; sapwood yellowish, turning reddish brown on exposure, the heartwood darker, tinged with red, hard and heavy, very tough, close-grained, taking a good polish. "Cacahuananche" (Michoacán, Guerrero, Sinaloa, Tepic); "cacahuanano" (Oaxaca; from the Nahuatl "cacahua-nantl," "cacao-mother"); "lengua de perico" (Veracruz); "madre de cacao" (Jalisco, Chiapas, Guatemala, Nicaragua, El Salvador, Panama, Philippines); "xak-yaab," "sacyab" (Yucatán, Maya); "iaiti" (Chiapas); "cansim" (Guatemala); "madera negra" (Costa Rica, Panama, Nicaragua); "sangre de drago" (Costa Rica); "bala" (Costa Rica, Panama); "madriado" (Nicaragua); "mataratón" (Panama, Colombia); "bien vestida," "piñón florido," "piñón amoroso" (Cuba); "cacaute" (Philippines).

Often planted for hedges, and a favorite shade tree for cacao and coffee plantations; grown from seeds or cuttings. The leaves are eaten by cattle but, like other parts of the plant, they are poisonous to rats, mice, and other rodents. The seeds or powdered bark mixed with rice, etc., are used in tropical America for poisoning rats and mice. The tree is said to have been introduced into the Philippines from Mexico at an early date.

This tree was first described by Oviedo (Lib. VIII, Cap. XXX), who says that in order to protect the cacao "they plant between the trees other trees which the Indians call *yaguaguyt* and the Christians *madera negra*, which grow almost twice as large as the cacao trees and protect them from the sun, and they prune the branches to make them grow straight. These trees are of such a nature that they live much longer than the cacao trees and never decay; it is one of the strongest woods known. The *madera negra* has very beautiful flowers, pink and white, in bunches, and they have a good odor; the fruit consists of pods

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which contain lentils, somewhat smaller than lupine seeds and very hard; they never shed their leaves and are trees that the Indians value for making hedges about their lands, and for wood for their houses or huts, for they say that it never decays. I tore down a sacrificial building in Nicaragua a quarter of a league or less outside the city of León, in the square of the Cacique Mahomotompo, who served me; for to separate the people from the rites and sacrifices and diabolic ceremonies we took from them the temples which, in the language of Charotega, to which that town belongs, they call *teyopa;* that is to say, houses of prayer. And I had taken to León the wooden posts, all of which were *madera negra,* and made a stable for my horses. When I asked the cacique and the old men who had made that temple, they said it was built many years before; so far as I could understand, it was a hundred years or more; the wood that had been two yards deep in the ground was still as green and fresh as if just cut, and the axes rebounded and were nicked in cutting it. I am often reminded by this wood of the Ark of the Covenant of the Old Testament, made of shittim wood, which was incorruptible, and of the same wood was made the altar of the Lord. I do not know whether this *madera negra* of Nicaragua is shittim wood; but I do know that the Indians hold it for a fact that it is imperishable, unless burnt, and so they affirm." Oviedo treats the tree in another chapter (Lib. VIII, Cap. XXXVIII) under the name "yagaguyt."

27. WILLARDIA Rose, Contr. U. S. Nat. Herb. 1: 97. 1891.

Unarmed shrubs or trees; leaves pinnate, the leaflets numerous, small or large; flowers showy, in axillary racemes; fruit flat, dehiscent.

Flowers 6 to 8 mm. long; leaflets 0.8 to 1.5 cm. long; fruit glabrous. 1. W. parviflora.

Flowers 15 to 25 mm. long; leaflets 1.5 to 5 cm. long; fruit pubescent.

Flowers about 1.5 cm. long, the standard glabrous_____2. W. mexicana.

Flowers 2 to 2.5 cm. long, the standard sericeous_____3. W. eriophylla.

1. **Willardia parviflora** Rose, Contr. U. S. Nat. Herb. 8: 313. 1905.

Known only from the vicinity of the type locality, Yautepec, Morelos.

Shrub, 3 to 4 meters high, much branched; leaflets 11 to 21, subcordiaceous, with revolute margins; fruit 4.5 to 7 cm. long, 1.2 cm. wide, acute at each end.

2. **Willardia mexicana** (S. Wats.) Rose, Contr. U. S. Nat. Herb. 1: 98. 1891.

Coursetia mexicana S. Wats. Proc. Amer. Acad. 21: 424. 1886.

Chihuahua, Sonora, and Sinaloa; type from Hacienda San Miguel, Chihuahua.

Shrub or tree, 3 to 12 meters high, the trunk sometimes 35 cm. or more in diameter; bark smooth; leaflets 9 to 15; flowers lilac; fruit flat, 5 to 12.5 cm. long. "Nesco," "palo piojo" (Chihuahua, Sinaloa, Sonora); "taliste" (Sinaloa).

Wood used for mining props, fuel, and for other purposes. A decoction of the bark is employed in Sinaloa to destroy parasites on cows and horses.

3. **Willardia eriophylla** (Benth.) Standl.

Lonchocarpus eriophyllus Benth. Journ. Proc. Linn. Soc. Bot. 4: Suppl. 94. 1860.

Michoacán, Guerrero, and Puebla; perhaps also in Morelos; type from Chilá, Puebla.

Tree, 4 to 5 meters high; leaflets about 13, oblong, obovate, or oval, densely pubescent; flowers reddish violet.

Specimens from Morelos have fruit 9 to 13 cm. long and 1.2 to 1.5 cm. wide. It is not certain that they are conspecific with the flowering specimens. The generic position of *Willardia eriophylla* can not be established with certainty until more material is collected.

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28. HESPEROTHAMNUS T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 499. 1919.

Erect shrubs or trees; leaflets pinnately 5-foliolate; flowers purple or purplish, large, in terminal racemes; fruit broadly linear, bivalvate.

Fruit about 17 mm. wide ..... 1. H. littoralis.
Fruit 7 to 10 mm. wide ..... 2. H. grandis.

1. **Hesperothamnus littoralis** T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 499. 1919.

Lonchocarpus littoralis T. S. Brandeg. Zoe 5: 157. 1903.

Southern Baja California.

Shrub or small tree; leaflets 3 to 6 cm. long, acute, densely pubescent; fruit about 8 cm. long.

2. **Hesperothamnus grandis** Standl., sp. nov.

Puebla and Oaxaca; type from Tehuacán, Puebla (*Rose & Hay* 5869; U. S. Nat. Herb. no. 395657).

Shrub or small tree, sometimes 7.5 meters high, the branchlets brownish, when young densely pilose with short, fulvous, spreading or reflexed hairs; leaf rachis 4 to 10.5 cm. long, the petiolules 3 to 5 mm. long, the stipels filliform; leaflets elliptic-oblong, ovate-oval, elliptic, oval, or rounded-oval, the terminal one sometimes rounded-obovate, 3.5 to 7 cm. long, 1.5 to 5.3 cm. wide, rounded, obtuse, or subcordate at base, rounded to acute at apex, often abruptly short-acuminate, thick, pale green, densely velvety-puberulent on the upper surface when young, beneath densely velvety-pilose with very short pale hairs, or in age glabrate; flowers fasciculate-racemose, short-pedicellate, the racemes dense or interrupted, 4.5 to 11 cm. long, usually long-pedunculate and equaling or longer than the leaves, the rachis densely short-pilose; calyx 5 to 7 mm. long, densely sericeous or short-pilose, the 4 lobes triangular or lanceolate, usually subulate-acuminate, equaling or longer than the tube; petals purplish, the standard thinly pilose outside with short, appressed or somewhat spreading hairs, the blade about 1 cm. long and broad, the claw 3 mm. long, the wing and keel petals of about the same length; style glabrous; fruit sessile, 5 to 6 cm. long, 6 to 10 mm. wide, compressed, bivalvate, strigose-sericeous, the margins slightly thickened.

The following additional collections belong here:

PUEBLA: Near Tehuacán, 1905, *Rose, Painter & Rose* 9923; in 1906, *Rose & Rose* 11281; *Pringle* 6748.

OAXACA: Canyon above Dominguillo, *Pringle* 5649. Six miles above Dominguillo, altitude 1,350 to 1,650 meters, *Nelson* 1826a.

29. MEIBOMIA Heist.; Fabr. Pl. Hort. Helmst. 168. 1759.

Herbs or shrubs, sometimes scandent; leaves pinnate, the leaflets usually 3 but sometimes only 1; flowers commonly racemose, small, purple to white; fruit of 1 to several joints, often covered with hooked hairs, the joints thus readily adhering to clothing.

One of the largest genera of Mexican plants, but most of the species are herbaceous. Besides the species listed here there are doubtless others which sometimes become shrubs. The plants are often browsed by stock, and some spcies of the genus have been cultivated as fodder crops.

Joints of the fruit notched on the upper side; plants usually scandent.
Leaflets suborbicular ..... 1. M. painteri.
Leaflets ovate or nearly so.
Joints of the fruit less than 1 cm. wide, much longer than broad. 2. M. angustata.
Joints of the fruit about 2 cm. wide, nearly as broad as long. 3. M. purpusii.

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Joints of the fruit not notched.
  Leaves unifoliolate.
    Fruit glabrous ..... 4. M. pallida.
    Fruit puberulent ..... 5. M. psilophylla.
  Leaves 3-foliolate.
    Joints of the fruit closely folded together.
      Leaflets oblong or ovate-oblong ..... 6. M. plicata.
      Leaflets oval or suborbicular ..... 7. M. plectocarpa.
    Joints of the fruit not folded together.
      Joints twice as long as wide or longer ..... 8. M. foliosa.
      Joints much less than twice as long as wide.
        Pubescence of the stems of numerous closely appressed hairs.
          Leaflets broadly rounded at apex; fruit sericeous ..... 9. M. robinsonii.
          Leaflets acute or acutish; fruit glabrous or puberulent.
            Bracts cuspidate-acuminate ..... 10. M. conzattii.
            Bracts obtuse or acutish ..... 11. M. jaliscana.
        Pubescence of the stems of spreading or recurved hairs, or wanting.
          Fruit glabrous or nearly so.
            Leaflets suborbicular or obovate-orbicular.
              Joints of the fruit 4 mm. long; leaflets mostly obovate-orbicular. 12. M. rubricaulis.
              Joints of the fruit 5 to 6 mm. long; leaflets suborbicular. 13. M. orbicularis.
            Leaflets oval to narrowly oblong.
              Joints of the fruit longer than broad. 14. M. chartacea.
              Joints of the fruit suborbicular ..... 15. M. nitida.
          Fruit copiously puberulent or pilose.
            Leaflets mostly oval or suborbicular, rounded at apex. 16. M. cinerea.
            Leaflets ovate to narrowly oblong or lanceolate, acute or acutish, or at least narrowed to the apex.
              Leaflets 5 cm. long or shorter; bracts small. 17. M. ghiesbreghtii.
              Leaflets 6 to 17 cm. long; bracts large and conspicuous.
                Leaflets linear-lanceolate, glabrate beneath. 18. M. macrostachya.
                Leaflets ovate, sericeous beneath ..... 19. M. amplifolia.

1. **Meibomia painteri** Rose & Standl. Contr. U. S. Nat. Herb. **16**: 214. 1913.

Known only from the type locality, Iguala Canyon, Guerrero.

Plants scandent, suffrutescent; leaflets orbicular. 3 to 8 cm. long; joints of the fruit about 1 cm. long and broad.

2. **Meibomia angustata** Rose & Standl. Contr. U. S. Nat. Herb. **16**: 215. 1913.

Known only from the type locality, between San Sebastián and Las Palmas, Jalisco.

Leaflets ovate-lanceolate, 2.5 to 8 cm. long.

3. **Meibomia purpusii** (T. S. Brandeg.) Blake, Contr. U. S. Nat. Herb. **24**: 6. 1921.

Desmodium lunatum T. S. Brandeg. Zoe **5**: 246. 1908. Not *D. lunatum* Huber. 1906.

Desmodium purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 53. 1914.

Veracruz; type from Zacuapan.

Scandent shrub; leaflets 5.5 to 9.5 cm. long, acute.

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4. **Meibomia pallida** Rose & Painter, Bot. Gaz. **40**: 145. *pl. 5.* 1905.

Known only from the type locality, Huilotepec, Oaxaca.

Low shrub; leaflets oblong to orbicular, 1 to 2.5 cm. long, obtuse or acute, pale.

5. **Meibomia psilophylla** (Schlecht.) Kuntze, Rev. Gen. Pl. **1**: 198. 1891.

Desmodium psilophyllum Schlecht. Linnaea **12**: 310. 1838.

San Luis Potosí and Veracruz to Chiapas and Puebla; type from Chiconquiaco. Guatemala.

Slender glabrous shrub, a meter high or less; leaflets oblong to narrowly lance-oblong, 2 to 8 cm. long, obtuse.

6. **Meibomia plicata** (Schlecht. & Cham.) Kuntze, Rev. Gen. Pl. **1**: 198. 1891.

Desmodium plicatum Schlecht. & Cham. Linnaea **5**: 585. 1830.

Sonora to Veracruz and Chiapas; type collected between Misantla and Colipa, Veracruz.

Shrub, 1 to 3.5 meters high; leaflets 2 to 7 cm. long, densely tomentose beneath; flowers purple. "Escobilla" (Michoacán, Guerrero).

7. **Meibomia plectocarpa** (Hemsl.) Kuntze, Rev. Gen. Pl. **1**: 198. 1891.

Desmodium plectocarpum Hemsl. Diag. Pl. Mex. 46. 1880.

San Luis Potosí and Veracruz; type from Orizaba.

Leaflets 2.5 to 6.5 cm. long, densely pubescent; flowers violet, in long dense racemes.

8. **Meibomia foliosa** (Hemsl.) Kuntze, Rev. Gen. Pl. **1**: 198. 1891.

Desmodium foliosum Hemsl. Biol. Centr. Amer. Bot. **1**: 278. 1880.

Veracruz and Oaxaca; type from Sierra San Pedro Nolasco.

Slender glabrous shrub; leaflets ovate or lanceolate, 2.5 to 7 cm. long, usually attenuate, thin, bright green.

9. **Meibomia robinsonii** Standl.

Desmodium jaliscanum obtusum Robinson, Proc. Amer. Acad. **26**: 164. 1891.

San Luis Potosí and Jalisco; type from Tamasopo Canyon, San Luis Potosí. Guatemala.

Shrub, 1 to 3 meters high; leaflets oval, 3.5 to 7 cm. long, densely pubescent.

10. **Meibomia conzattii** (Greenm.) Standl.

Desmodium conzattii Greenm. Field Mus. Bot. **2**: 331. 1912.

Guerrero to Veracruz and Oaxaca; type from San Bernardino, Oaxaca.

Shrub, 1 to 4.5 meters high; leaflets ovate or oblong, 3 to 8 cm. long; flowers purplish, rather large.

11. **Meibomia jaliscana** (S. Wats.) Standl.

Desmodium jaliscanum S. Wats. Proc. Amer. Acad. **22**: 406. 1887.

Jalisco and Guanajuato; type from Río Blanco, Jalisco.

Shrub, 1 to 2.5 meters high; leaflets lance-oblong or ovate-oblong, 3 to 9 cm. long.

12. **Meibomia rubricaulis** Rose & Painter, Bot. Gaz. **40**: 145. 1905.

Sinaloa and Durango to Guerrero; type from Etzatlán, Jalisco.

Slender shrub, 1 to 2 meters high, with purple flowers; leaflets 1 to 2 cm. long, glabrate.

13. **Meibomia orbicularis** (Schlecht.) Kuntze, Rev. Gen. Pl. **1**: 198. 1891.

Desmodium orbiculare Schlecht. Linnaea **12**: 311. 1838.

San Luis Potosí and Veracruz to Chiapas and Oaxaca; type from Regla, Hidalgo. Guatemala.

Slender shrub or herb; leaflets 1 to 2.5 cm. long, pale beneath, glabrate; flowers purplish. "Engorda-cabra" (Guanajuato).

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14. Meibomia chartacea (T. S. Brandeg.) Standl.
Desmodium chartaceum T. S. Brandeg. Zoe 5: 202. 1905.
Known only from the type locality, near Culiacán, Sinaloa.
Leaflets narrowly lance-oblong, 3.5 to 7.5 cm. long, pale.

15. Meibomia nitida (Mart. & Gal.) Kuntze, Rev. Gen. Pl. 1: 198. 1891.
Desmodium nitidum Mart. & Gal. Bull. Acad. Brux. 10[2]: 186. 1843.
Veracruz, Oaxaca (type locality), and Guerrero.
Slender shrub, 1 to 4 meters high, with purple flowers; leaflets mostly ovate, 3 to 6 cm. long, bright green.

16. Meibomia cinerea (H. B. K.) Standl.
Hedysarum cinereum H. B. K. Nov. Gen. & Sp. 6: 526. *pl. 599.* 1823.
Desmodium cinereum DC. Prodr. 2: 330. 1825.
Desmodium chiapense T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 53. 1914.
Tepic to Chiapas; type collected near Mexcala and Chilpancingo, Guerrero. Central America.
Shrub, 1 to 2.5 meters high; leaflets 3 to 7 cm. long, densely pubescent or tomentose.

17. Meibomia ghiesbreghtii (Hemsl.) Kuntze, Rev. Gen. Pl. 1: 198. 1891.
Desmodium ghiesbreghtii Hemsl. Biol. Centr. Amer. Bot. 1: 279. 1880.
Mexico and Oaxaca (type locality).
Shrub, 1 to 2.5 meters high.

18. Meibomia macrostachya (Hemsl.) Kuntze, Rev. Gen. Pl. 1: 198. 1891.
Desmodium macrostachyum Hemsl. Diag. Pl. Mex. 44. 1880.
Jalisco to Morelos and Oaxaca (type locality).
Plants 1.5 to 2.5 meters high; leaflets 5.5 to 17 cm. long; flowers in very long, mostly simple racemes.

19. Meibomia amplifolia (Hemsl.) Kuntze, Rev. Gen. Pl. 1: 197. 1891.
Desmodium amplifolium Hemsl. Biol. Centr. Amer. Bot. 1: 274. 1880.
Oaxaca (type locality) and Chiapas. Guatemala.
Leaflets 5 to 12 cm. long, sericeous beneath.

30. NISSOLIA Jacq. Enum. Pl. Carib. 7. 1760.

REFERENCE: Rose, Contr. U. S. Nat. Herb. 5: 157–163. 1899.

Plants usually scandent, fruticose or herbaceous; leaves odd-pinnate, the leaflets usually 5; flowers small, yellow, racemose or verticillate in the leaf axils; fruit indehiscent, of few short broad joints, the terminal joint with a large thick terminal wing.

The species are very closely related, and it is doubtful whether all those listed here are really distinct.

Calyx or fruit or both with few or numerous yellow bristle-like hairs.
- Fruit setose-hispid.
  - Leaflets densely pilose beneath; fruit rounded at the apex ... 1. N. dodgei.
  - Leaflets glabrous beneath; fruit acute ... 2. N. setosa.
- Fruit not setose-hispid.
  - Plants scandent; fruit not constricted ... 3. N. schottii.
  - Plants prostrate; fruit conspicuously constricted into joints. 4. N. wislizeni.

Calyx and fruit without yellow bristle-like hairs.
- Flowers all or chiefly in naked racemes.
  - Calyx lobes long, filiform-subulate ... 5. N. guatemalensis.
  - Calyx lobes very short, deltoid ... 6. N. nelsoni.
- Flowers verticillate in the axils of the leaves.

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Calyx tube about 5 mm. long.....7. N. platycalyx.
Calyx tube 1.5 to 3.5 mm. long.
Leaflets densely and persistently pilose beneath.....8. N. hirsuta.
Leaflets glabrous beneath or nearly so.
Leaflets large, most of them 2.5 to 4 cm. long, all much longer than broad. 9. N. laxior.
Leaflets small, most of them 1 to 2 cm. long, those of the lower leaves usually orbicular or nearly so.....10. N. pringlei.

1. **Nissolia dodgei** Rose, Contr. U. S. Nat. Herb. 5: 161. *f. 23.* 1899.
Coahuila and Neuvo León; type from Monterrey, Nuevo León.
Leaflets 1 to 2 cm. long; fruit 2 cm. long, 2 or 3-seeded.

2. **Nissolia setosa** T. S. Brandeg. Proc. Calif. Acad. II. 3: 127. 1891.
Southern Baja California; type from Triunfo.
Vine, 3 to 4 meters long; leaflets 5, orbicular, 1 to 2 cm. long; flowers 4 mm. long, dark yellow.

3. **Nissolia schottii** (Torr.) A. Gray, Journ. Linn. Soc. 5: 26. 1861.
Chaetocalyx schottii Torr. U. S. & Mex. Bound. Bot. 56. *pl. 18.* 1859.
Chihuahua, Sonora, and Sinaloa; type from Sierra Verde, Sonora. Southern Arizona.
Leaflets 5, oval or orbicular, 1 to 3.5 cm. long; flowers nearly 1 cm. long; fruit 2.5 to 3 cm. long.

4. **Nissolia wislizeni** A. Gray, Journ. Linn. Soc. 5: 25. 1861.
Chaetocalyx wislizeni A. Gray, Pl. Wright. 1: 51. 1852.
Chihuahua and Sonora to Zacatecas and Hidalgo; type collected near the city of Chihuahua. Southern Arizona.
Leaflets orbicular or nearly so, 8 to 15 mm. long; flowers 1 cm. long or slightly larger.
This species differs from the others in being prostrate rather than scandent. The plants are nearly or quite herbaceous.

5. **Nissolia guatemalensis** Rose, Contr. U. S. Nat. Herb. 5: 162. 1890.
Sinaloa. Guatemala (type locality).
Leaflets oval, 3 to 7 cm. long, obtuse or acutish; flowers 6 mm. long, very numerous, in long racemes.
Although known in Mexico from a single locality far distant from Guatemala, the specimens can not be distinguished from those from the latter region.

6. **Nissolia nelsoni** Rose, Contr. U. S. Nat. Herb. 5: 162. *f. 26.* 1899.
Sinaloa and Jalisco to Veracruz and Chiapas; type from the Valley of Oaxaca.
Plants climbing to a height of 3 to 4.5 meters; leaflets elliptic to orbicular, 2 to 5.5 cm. long, acutish to broadly rounded at apex. "Riatilla" (Sinaloa).
It is doubtful whether this is distinct from *N. fruticosa* Jacq., of Columbia.

7. **Nissolia platycalyx** S. Wats. Proc. Amer. Acad. 17: 344. 1882.
Known only from the type locality, in the mountains east of Saltillo, Coahuila.

8. **Nissolia hirsuta** DC. Prodr. 2: 257. 1825.
Nissolia confertiflora S. Wats. Proc. Amer. Acad. 21: 424. 1886.
Chihuahua to Sinaloa, Oaxaca, and Morelos; type from Guanajuato.
Leaflets 1 to 5.5 cm. long, thin, bright green; wing of the fruit 1 cm. wide or narrower.

9. **Nissolia laxior** (Robinson) Rose, Contr. U. S. Nat. Herb. 5: 162. 1899.
Nissolia confertiflora laxior Robinson, Proc. Amer. Acad. 29: 315. 1894.

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Nissolia montana Rose, Contr. U. S. Nat. Herb. 8: 48. 1903.

Jalisco and Guanajuato to Morelos and Puebla; type from Beltran, Jalisco.

Leaflets elliptic or oval, thin, bright green; flowers 1 cm. long.

10. **Nissolia pringlei** Rose, Contr. U. S. Nat. Herb. 5: 159. *f. 20.* 1899.

Nissolia diversifolia Rose, Contr. U. S. Nat. Herb. 5: 160. *f. 21.* 1899.

Nissolia multiflora Rose, Contr. U. S. Nat. Herb. 5: 161. *f. 24.* 1899.

Chihuahua to Morelos and Oaxaca; type from Santa Eulalia Mountains, Chihuahua.

Flowers about 7 mm. long; fruit 3 cm. long, the wing about 7 mm. wide.

DOUBTFUL SPECIES.

NISSOLIA PLATYCARPA Benth. in Mart, Fl. Bras. 15 [1]: 77. 1859. Type from Zimapán, Hidalgo. This species has never been properly described, and it is impossible to place it definitely.

31. AMICIA H. B. K. Nov. Gen. & Sp. 6: 511. 1823.

1. **Amicia zygomeris** DC. Prodr. 2: 315. 1825.

Chihuahua to Tepic, Oaxaca, and Veracruz.

Slender unarmed shrub, or sometimes herbaceous, glabrous or pilose, leaflets 4 or 6, 2 to 6 cm. long and nearly as wide, truncate or emarginate at apex, conspicuously gland-dotted; flowers 3 to 3.5 cm. long, yellow, racemose, subtended by large, orbicular or reniform bracts.

32. PICTETIA DC. Ann. Sci. Nat. 9: 93. 1825.

1. **Pictetia microphylla** Benth.; Hemsl. Diag. Pl. Mex. 8. 1878.

Type collected in Sonora; plant known to the writer only from the description.

Glandular-pubescent shrub; leaves pinnate, the leaflets 4 or 5 pairs, lanceolate, 3 mm. long, pungent; flowers 1.8 cm. long, racemose; fruit stipitate, 3 or 4-seeded, constricted between the seeds.

33. AESCHYNOMENE L. Sp. Pl. 713. 1753.

Small shrubs or herbaceous plants; leaves odd-pinnate; flowers small, in axillary racemes or clusters; fruit flat, of 2 to several joints.

Several other species besides those enumerated here occur in Mexico, but they are all herbaceous forms.

Stipules conspicuously produced below the point of insertion.
- Leaflets acute or acutish, the costa near the margin ..... 1. A. americana.
- Leaflets very obtuse, the costa central.
  - Stems glabrous or nearly so ..... 2. A. sensitiva.
  - Stems hispid.
    - Fruit 5 to 6 mm. wide ..... 3. A. hispida.
    - Fruit 3 to 4 mm. wide ..... 4. A. hispidula.

Stipules not produced below the point of insertion.
- Costa of the leaflets excentric, usually near the margin; leaflets 3.5 mm. wide or narrower, often acute.
  - Leaflets densely white-sericeous ..... 5. A. nivea.
  - Leaflets green, thinly sericeous or strigose or glabrate.
    - Leaflets obtuse, the costa not very close to the margin.
      - Corolla 10 to 12 mm. long; leaflets 2.5 to 3.5 mm. wide. 6. A. fascicularis.
      - Corolla 6 to 7 mm. long; leaflets 1 to 1.5 mm. wide ..... 7. A. oligantha.
    - Leaflets acute, the costa very close to the margin.
      - Leaflets 6 to 10 pairs ..... 8. A. purpusii.
      - Leaflets mostly more than 10 pairs ..... 9. A. compacta.

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Costa of the leaflets central; leaflets often more than 3.5 mm. wide, obtuse or rounded at apex.
Standard petal glabrous.
Leaflets numerous, 1.2 to 3 mm. wide.....10. **A. amorphoides.**
Leaflets 15 or fewer, 4 to 16 mm. wide.....11. **A. palmeri.**
Standard petal variously pubescent.
Venation of the leaflets reticulate.
Calyx glabrous; branches of the inflorescence glabrous or nearly so. 12. **A. simulans.**
Calyx pubescent; branches of the inflorescence densely pilose and often hispid.....13. **A. petraea.**
Venation of the leaflets not reticulate.
Leaflets 7 to 11.
Leaflets glabrous or nearly so.....14. **A. fruticosa.**
Leaflets densely sericeous or pilose.....15. **A. vigil.**
Leaflets 15 or more.
Leaflets 3.5 to 6 mm. wide.....16. **A. pringlei.**
Leaflets 2 mm. wide or narrower.....17. **A. paniculata.**

1. **Aeschynomene americana** L. Sp. Pl. 713. 1753.
Aeschynomene glandulosa Poir. in Lam. Encycl. Suppl. 4: 76. 1816.
Aeschynomene floribunda Mart. & Gal. Bull. Acad. Brux. 10²: 180. 1843.
Aeschynomene americana depila Millsp. Field Mus. Bot. 1: 363. 1898.
Chihuahua to Sinaloa, Chiapas, Yucatán, and Veracruz. Widely distributed in tropical America; type from Jamaica.
Plants suffrutescent and sometimes a meter high, or often herbaceous; leaflets numerous, oblong-linear, about 1 cm. long; flowers small, pale yellow to brownish yellow, sometimes striped with purple. "Huevo de rana" (Nicaragua); "hierba rosario" (Porto Rico); "pegapega" (Cuba).
Of some importance as a forage plant.

2. **Aeschynomene sensitiva** Swartz, Prodr. Veg. Ind. Occ. 107. 1788.
Sinaloa to Veracruz. Widely distributed in tropical America; also in Africa.
Plants suffrutescent or herbaceous, sometimes 4 meters high; leaflets oblong, 6 to 15 mm. long; flowers pale yellow with red veins, about 1 cm. long; fruit 4 to 8 cm. long, 3 to 6 mm. wide. "Hierba de ciénaga," "hierba rosario" (Porto Rico).

3. **Aeschynomene hispida** Willd. Sp. Pl. 3: 1163. 1800.
Sinaloa and Durango to Veracruz and Oaxaca. Widely distributed in tropical America.
Herbaceous or suffrutescent; flowers yellow, striped with red, 10 to 14 mm. long.

4. **Aeschynomene hispidula** H. B. K. Nov. Gen. & Sp. 6: 531. 1823.
Michoacán to Veracruz and Oaxaca. Central America and South America; type from Colombia.
Herbaceous or suffrutescent, sometimes 3.5 meters high; flowers scarcely 1 cm. long.

5. **Aeschynomene nivea** T. S. Brandeg. Proc. Calif. Acad. II. 2: 150. 1889.
Baja California; type from Purísima.
Silvery-sericeous shrub, 0.6 to 1 meter high; leaflets numerous, oblong-linear, 4 to 10 mm. long; flowers ochroleucous or sulphur-yellow, 1 cm. long; fruit usually of only 2 joints.

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6. **Aeschynomene fascicularis** Schlecht. & Cham. Linnaea 5: 584. 1830.
Chihuahua and Sonora to Jalisco and Yucatán; type collected between Laguna Verde and Actopan (Veracruz ?). Central America.
Shrub, 1 to 2.5 meters high, with yellow flowers.

7. **Aeschynomene oligantha** Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 526. 1903.
Known only from the type locality, "Mata de Dios," Michoacán or Guerrero. Doubtfully distinct from *A. fascicularis*.

8. **Aeschynomene purpusii** T. S. Brandeg. Zoe 5: 247. 1908.
Known only from the type locality, Zacuapan, Veracruz.

9. **Aeschynomene compacta** Rose, Contr. U. S. Nat. Herb. 5: 191. 1899.
Aeschynomene oaxacana T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 181. 1915.
Puebla and Oaxaca; type from Tomellín Canyón, Oaxaca.
Shrub, 1 to 1.5 meters high; leaflets 3 to 10 mm. long.

10. **Aeschynomene amorphoides** (S. Wats.) Rose; Robinson, Proc. Amer. Acad. 29: 315. 1894.
Brya amorphoides S. Wats. Proc. Amer. Acad. 22: 406. 1887.
Sinaloa to Colima; type from Tequila, Jalisco.
Shrub, about a meter high; flowers purplish, 6 mm. long; joints of the fruit 1 or 2.

11. **Aeschynomene palmeri** Rose, Contr. U. S. Nat. Herb. 5: 192. 1899.
Aeschynomene paucifoliolata Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 256. *pl. 9.* 1903.
Guerrero; type from Acapulco.
Shrub, 1 to 3 meters high, with purplish flowers.

12. **Aeschynomene simulans** Rose, Contr. U. S. Nat. Herb. 5: 192. 1899.
Sinaloa and Tepic; type collected between Rosario and Colomas, Sinaloa.
Plants suffrutescent; flowers yellow, tinged with purple.

13. **Aeschynomene petraea** Robinson, Proc. Amer. Acad. 27: 166. 1892.
Aeschynomene madrensis Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 255. *pl. 8.* 1903.
Durango to Guerrero; type from Guadalajara.
Plants suffrutescent, 1 to 1.5 meters high; flowers large, yellow, striped with brown or purple.

14. **Aeschynomene fruticosa** Rose, Contr. U. S. Nat. Herb. 5: 192. 1899.
Known only from the type locality, Topolobampo, Sinaloa.
Shrub, 1 to 1.5 meters high, with small yellow flowers.

15. **Aeschynomene vigil** T. S. Brandeg. Proc. Calif. Acad. II. 3: 128. 1891.
Southern Baja California; type from San José del Cabo.
Shrub, about a meter high, with white stems; flowers purple.

16. **Aeschynomene pringlei** Rose, Contr. U. S. Nat. Herb. 8: 312. 1905.
Known only from the type locality, limestone hills near Jojutla, Morelos.
Shrub, 3 to 4.5 meters high.

17. **Aeschynomene paniculata** Willd.; Vog. Linnaea 12: 95. 1838.
Guerrero to Veracruz. South America; type from Brazil.

34. CLIMACORACHIS Hemsl. & Rose, Contr. U. S. Nat. Herb. 8: 43. 1903.

Low erect shrubs or herbs; leaves pinnate, the leaflets small, numerous; flowers yellow, racemose, the racemes geniculate; fruit flat, 2 to 4-seeded.

Stems glabrous ..... 1. C. mexicana.
Stems glandular-pilose ..... 2. C. fruticosa.

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1. **Climacorachis mexicana** Hemsl. & Rose, Contr. U. S. Nat. Herb. 8: 43. 1903.

Known only from the type locality, in the Sierra Madre west of Bolaños, Jalisco.

Leaflets 9 to 12 pairs, linear, 4 to 5 mm. long; fruit 5 to 10 mm. long.

2. **Climacorachis fruticosa** Hemsl. & Rose, Contr. U. S. Nat. Herb. 8: 44. 1903.

Known only from the type locality, mountains near Talpa, Jalisco, altitude 1,320 to 1,500 meters.

Leaflets sometimes 20 pairs, 7 mm. long.

35. ABRUS Adans. Fam. Pl. 2: 327. 1763.

1. **Abrus precatorius** L. Syst. Nat. ed. 12. 2: 472. 1767.

Glycine abrus L. Sp. Pl. 753. 1753.

Veracruz; reported from Yucatán. West Indies, South America, Asia, and Africa.

Scandent shrub with pinnate leaves; leaflets numerous, oblong, 1 to 1.5 cm. long, bright green, very obtuse; flowers racemose, pink or purplish; fruit short, broad; seeds 4 to 6, scarlet, black about the hilum. "Xocoac," "xoxoag" (Yucatán, Maya); "peonía" (Cuba); "peronía," "peronilas" (Porto Rico); "brujitos," "chochitos de Indio," "pionías," "peronilla" (Colombia).

The English names are "bead-vine," "wild licorice," and "crab's-eyes." Stems strong and used as cordage. The leaves and root have the flavor of licorice, and the latter is sometimes employed as a substitute for that article. The root is said to contain glycyrrhizin, the principle found in true licorice (*Glycyrrhiza glabra* L.). The leaves are sensitive to changes in light intensity; they droop vertically during the night and rise to a horizontal position in the morning. Lunan states that the dried leaves were used in India as a substitute for tea.

The plant is reported to have poisoned cattle in India, and the seeds are certainly poisonous. They have been used in that country for criminal poisoning, but are said to be inert if swallowed whole. It is said that the poisonous properties are destroyed by heat and that the seeds have been used for food in some countries, but this is perhaps erroneous. They contain abric acid and two proteid poisons, to one of which the name abrine has been given. They are known in commerce as "jequirity seeds," and have been employed by European physicians in treating diseases of the eye and skin. The seeds are very handsome and are strung into bracelets and necklaces. Because of their uniformity in size they were formerly used as weights by jewel merchants. The leaves are applied externally to swellings in India and are chewed with sugar for coughs.

36. RAMIREZELLA Rose, Contr. U. S. Nat. Herb. 8: 44. 1903.

Scandent plants, fruticose, at least at the base; leaves pinnately trifoliolate, the leaflets large; flowers racemose, at first covered with large striate bracts; fruit linear, compressed, bivalvate.

The species are very closely related, and more material is necessary to determine their validity.

Fruit densely pilose; calyx short-pilose ..... 1. **R. pubescens.**
Fruit and calyx glabrous or nearly so.
  Peduncles and rachis glabrous or nearly so ..... 2. **R. buseri.**
  Peduncles and rachis of the inflorescence copiously pilose.
    Lower calyx lobes acute ..... 3. **R. pringlei.**
    Lower calyx lobes rounded or obtuse ..... 4. **R. strobilophora.**

1. **Ramirezella pubescens** Rose, Contr. U. S. Nat. Herb. 8: 45. 1903.

Known only from the type locality, between Tlapa and Tlaliscatilla, Guerrero, altitude 1,170 to 1,350 meters.

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Leaflets broadly ovate, about 8 cm. long, acuminate, densely pubescent beneath; fruit long-beaked.

2. **Ramirezella buseri** (Micheli) Rose, Contr. U. S. Nat. Herb. 12: 274. 1909.
Phaseolus buseri Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 263. *pl. 13.* 1903.
Ramirezella occidentalis Rose, Contr. U. S. Nat. Herb. 8: 45. 1903.
Ramirezella glabrata Rose, Contr. U. S. Nat. Herb. 8: 45. 1903.
Jalisco to Guerrero; type from La Botella, altitude 350 meters.
Leaflets ovate or broadly ovate, 4 to 10 cm. long, acuminate, glabrate; flowers purplish white, large and showy.
With more ample material, it may be possible to recognize more than a single species here.

3. **Ramirezella pringlei** Rose, Contr. U. S. Nat. Herb. 12: 274. 1909.
Known only from the type locality, Iguala Canyon, Guerrero, altitude 900 meters.
Leaflets 6 to 10 cm. long, glabrate; corolla violet, 2 cm. long.

4. **Ramirezella strobilophora** (Robinson) Rose, Contr. U. S. Nat. Herb. 5: 44. 1903.
Vigna strobilophora Robinson, Proc. Amer. Acad. 27: 167. 1892.
Chihuahua to Jalisco; type collected near Guadalajara.
Scandent shrub, the stems sometimes 2.5 cm. thick; leaflets 6 to 8 cm. long, acuminate; flowers purple and white, in dense racemes; fruit 9 to 12 cm. long, about 1.5 cm. wide.

37. CLITORIA L. Sp. Pl. 753. 1753.

Shrubby or herbaceous plants, often scandent; leaves pinnate, with usually 3 leaflets; flowers large, showy, solitary or clustered in the axils of the leaves or short-racemose.

Besides the species listed here, *C. ternatea* L., a herbaceous vine, with 5 leaflets, also occurs in Mexico.

Leaves sessile or very short-petiolate ..... 1. C. subsessilis.
Leaves long-petiolate.
  Flowers about 7 cm. long ..... 2. C. javitensis.
  Flowers 2 to 4 cm. long.
    Plants scandent. Leaflets acute or acuminate, pale beneath. 3. C. mexicana.
    Plants erect.
      Pubescence of the stems appressed ..... 4. C. multiflora.
      Pubescence of the stems spreading.
        Flowers about 2.5 cm. long ..... 5. C. triflora.
        Flowers about 4 cm. long ..... 6. C. humilis.

1. **Clitoria subsessilis** Rose, Contr. U. S. Nat. Herb. 5: 169. 1899.
Oaxaca; type collected between Guichocovi and Lagunas.
Plants low, erect, herbaceous or suffrutescent; leaflets linear-oblong, obtuse; flowers 4.5 to 5.5 cm. long.

2. **Clitoria javitensis** (H. B. K.) Benth. Journ. Linn. Soc. 2: 42. 1858.
Neurocarpum javitense H. B. K. Nov. Gen. & Sp. 6: 409. 1823.
Reported from Veracruz and Mexico. Panama and northern South America; type from Javita.
Scandent or repent shrub; leaflets oval or elliptic, acuminate, 8 to 15 cm. long, pubescent beneath.

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3. **Clitoria mexicana** Link, Enum. Pl. 2: 235. 1822.

Veracruz, Puebla, and Oaxaca. Guatemala.

Stems slender, scandent, herbaceous or suffruticose; leaflets ovate, 4 to 6 cm. long; flowers blue; fruit 3.5 to 5.5 cm. long, 6 mm. wide.

Closely related to *C. mariana* L., under which name it has been reported from Mexico.

4. **Clitoria multiflora** Mart. & Gal. Bull. Acad. Brux. 10[2]: 188. 1843.

Clitoria polystachya Benth. Pl. Hartw. 60. 1840.

Tepic to Oaxaca and Veracruz; type from Mirador, Veracruz.

Erect shrub, about a meter high; leaflets mostly ovate, acuate or acuminate, 4 to 11 cm. long; flowers white, spotted with violet, 3 to 3.5 cm. long.

5. **Clitoria triflora** S. Wats. Proc. Amer. Acad. 2: 407. 1887.

Durango, Jalisco, and Michoacán; type from Río Blanco, Jalisco.

Plants erect, 30 to 60 cm. high, suffrutescent; leaflets oblong-lanceolate, 4 to 9.5 cm. long, obtuse or acute; flowers dark purple and lilac; fruit about 4 cm. long and 6 to 7 mm. wide.

Clitoria monticola T. S. Brandeg.,[1] described from Baja California, is closely related, judging from the description. The writer has seen no material of it.

6. **Clitoria humilis** Rose, Contr. U. S. Nat. Herb. 5: 169. 1899.

Known only from the type locality, Sierra Madre of Durango.

Plants herbaceous or suffrutescent, 10 to 20 cm. high or larger; leaflets oval or oblong; flowers apparently white.

38. DIOCLEA H. B. K. Nov. Gen. & Sp. 6: 437. 1823.

1. **Dioclea guianensis** Benth. Ann. Wien. Mus. Naturg. 2: 134: 1838.

Tabasco. Central America and northern South America; type from British Guiana.

Scandent shrub with pinnately 3-foliolate leaves, the leaflets broad, 5 to 12 cm. long, short-acuminate, pubescent; flowers purple or blue, 3 cm. long, in long, spikelike racemes; fruit flat, about 9 cm. long and 1.5 cm. wide. "Haba de monte" (Panama).

39. CANAVALIA Adans. Fam. Pl. 2: 325. 1763.

Scandent or prostrate herbs or shrubs; leaves pinnately 3-foliolate; flowers large, racemose; fruit flat, bivalvate.

Several herbaceous species occur in Mexico. The generic name was originally written *Canavali*.

Valves of the fruit each with 2 central costae; leaflets glabrous beneath or nearly so ..... 1. **C. acuminata.**

Valves of the fruit each with one central costa; leaflets usually pilose beneath.

Lower calyx lobes minute, lance-ovate, very acute; calyx thinly sericeous or glabrate ..... 2. **C. villosa.**

Lower calyx lobes large, orbicular; calyx very densely sericeous. 3. **C. hirsuta.**

1. **Canavalia acuminata** Rose, Contr. U. S. Nat. Herb. 1: 322. 1895.

Known only from the type locality, Manzanillo, Colima.

Scandent shrub, nearly glabrous; flowers large, cream-colored; fruit 15 to 20 cm. long, flat; seeds brownish black.

2. **Canavalia villosa** Benth. Ann. Wien. Mus. Naturg. 2: 135. 1838.

Canavalia rostrata Benth. Ann. Wien. Mus. Naturg. 2: 135. 1838.

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[1] Univ. Calif. Publ. Bot. 6: 500. 1919.

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Wenderothia discolor Schlecht. Linnaea **12**: 331. 1838.
Wenderothia pilosa Mart. & Gal. Bull. Acad. Brux. **10**[2]: 191. 1843.
Wenderothia glabra Mart. & Gal. Bull. Acad. Brux. **10**[2]: 193. 1843.
Sinaloa to Nuevo León, Tabasco, and Chiapas. Central America.
Scandent shrub or herb; leaflets 6 to 11 cm. long, usually oval, short-acuminate; flowers violet, showy, 3.5 cm. long; fruit about 15 cm. long and 2 cm. wide, densely pilose. "Patito" (Michoacán, Guerrero); "frijolillo" (Sinaloa, Puebla, Tabasco); "gallinitas" (*Urbina*).

3. **Canavalia hirsuta** (Mart. & Gal.) Standl.
Wenderothia hirsuta Mart. & Gal. Bull. Acad. Brux. **10**[2]: 192. 1843.
Veracruz to Guerrero and Chiapas; type from Oaxaca. Guatemala.
Scandent shrub, similar to *C. villosa*.
The bractlets at the base of the calyx are much larger than in the preceding species.

40. ERIOSEMA Desv. Ann. Sci. Nat. 9: 421. 1826.

Low shrubs or herbs, unarmed; leaves pinnate, 3-foliolate or rarely unifoliolate, the leaflets gland-dotted beneath; flowers yellow, racemose, often large and showy; fruit compressed, bivalvate, short, usually 2-seeded.

Flowers in elongate racemes.
Flowers about 1.5 cm. long; lobes of the calyx scarcely longer than the tube. **1. E. multiflorum.**
Flowers 2 cm. long; lobes of the calyx fully twice as long as the tube. **2. E. grandiflorum.**
Flowers in very short headlike racemes.
Pubescence of the lower surface of the leaflets closely appressed. **3. E. diffusum.**
Pubescence of the lower surface of the leaflets chiefly loose and spreading.
Corolla 12 to 14 mm. long; peduncles shorter than the racemes; leaflets of the lower leaves less than twice as long as wide_____**4. E. palmeri.**
Corolla less than 10 mm. long; peduncles usually longer than the racemes; leaflets more than twice as long as wide_____**5. E. pulchellum.**

1. **Eriosema multiflorum** Robinson, Proc. Amer. Acad. **29**: 316. 1894.
Known only from the type locality, rocky hills near Tequila, Jalisco.
Shrub, 0.6 to 1 meter high; leaves subsessile, the 3 leaflets oblong, rounded at apex, rugose.

2. **Eriosema grandiflorum** (Schlecht. & Cham.) Seem. Bot. Voy. Herald 345. 1857.
Rhynchosia grandiflora Schlecht. & Cham. Linnaea **5**: 588. 1830.
Sonora to Oaxaca and Veracruz; type from Hacienda de la Laguna, Veracruz.
Erect shrub, 1 to 2 meters high; leaflets mostly oblong, 4 to 9 cm. long, obtuse or acute, densely pubescent; flowers in long racemes, large and showy. "Jarilla de la sierra" (Sinaloa).

3. **Eriosema diffusum** (H. B. K.) Don, Hist. Dichl. Pl. **2**: 347. 1832.
Glycine diffusa H. B. K. Nov. Gen. & Sp. **6**: 420. *pl. 572*. 1823.
Sinaloa to Chiapas and Veracruz. Central America and Colombia (type locality).
Plants erect, herbaceous or suffrutescent, closely but sparsely sericeous; leaflets linear-oblong to oval, 2.5 to 7 cm. long; fruit short, densely pilose. "Guapo" (Guatemala); "guapillo" (Guatemala, Honduras, *Blake*); "hierba del duende" (Sinaloa).
An infusion of the plant is used in Guatemala for female diseases.

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4. Eriosema palmeri S. Wats. Proc. Amer. Acad. 22: 408. 1887.

San Luis Potosí to Jalisco and Tepic; type from Tequila, Jalisco.

Plants low, herbaceous or suffrutescent, copiously hirsute with fulvous or brown hairs; roots tuberous-thickened.

Specimens reported from Veracruz as *E. crinitum* (H. B. K.) Don probably belong to this species.

Rhynchosia hirsuta Mart. & Gal.[1] is either this plant or a closely related one.

5. Eriosema pulchellum (H. B. K.) Don, Hist. Dichl. Pl. 2: 348. 1832.

Glycine pulchella H. B. K. Nov. Gen. & Sp. 6: 422. 1823.

Chihuahua to Veracruz and Oaxaca. Central America; Colombia (type locality).

Plants suffrutescent; leaflets mostly oblong, 2.5 to 7 cm. long, obtuse.

The leaves are sometimes unifoliolate on young plants.

41. DOLICHOLUS Medic. Vorles. Churpf. Phys. Ges. 2: 354. 1787.

Plants herbaceous or frutescent, scandent or prostrate or rarely erect; leaves usually pinnately 3-foliolate, rarely unifoliolate; flowers racemose; fruit bivalvate.

A few herbaceous species not enumerated here are found in Mexico.

Plants erect ..... 1. D. pringlei.
Plants scandent.
  Flowers 1.5 to 2 cm. long or larger.
    Leaflets acute; bracts broadly ovate, acute ..... 2. D. macrocarpus.
    Leaflets long-acuminate; bracts lanceolate or lance-ovate, acuminate. 3. D. discolor.
  Flowers 1 cm. long or shorter.
    Calyx lobes subequal, the upper ones 3 times as long as the tube or longer. 4. D. longeracemosus.
    Calyx lobes unequal, the upper ones about as long as the tube.
      Fruit more or less hispid, not constricted between the seeds.
        Leaflets longer than broad, not reticulate-veined; fruit long-hispid; stems scarcely at all viscid-pubescent ..... 5. D. nigropunctatus.
        Leaflets about as broad as long, conspicuously reticulate-veined; fruit short-hispid; stems densely viscid-pilose ..... 6. D. potosinus.
      Fruit velutinous-puberulent, often constricted between the seeds.
        Fruit 4 to 5 mm. wide, not constricted between the seeds. 7. D. minimus.
        Fruit 8 to 12 mm. wide, constricted between the seeds. 8. D. phaseoloides.

1. Dolicholus pringlei Rose, Contr. U. S. Nat. Herb. 10: 101. 1906.

Rhynchosia pringlei Rose, Contr. U. S. Nat. Herb. 3: 316. 1895.

Oaxaca; type from Las Sedas.

Erect shrub, 1 to 1.5 meters high; leaflets strongly reticulate-veined, 2.5 to 5 cm. long and nearly as wide, densely pubescent; flowers large, in long narrow panicles; fruit hirsute; seeds dark brown.

2. Dolicholus macrocarpus (Benth.) Rose, Contr. U. S. Nat. Herb. 10: 101. 1906.

Rhynchosia macrocarpa Benth. Pl. Hartw. 11. 1839.

Chihuahua and Durango to Hidalgo; type from Aguascalientes.

Plants scandent, herbaceous or suffrutescent; leaflets 3 to 11 cm. long, densely pubescent; flowers large, in long racemes; fruit about 4 cm. long and 1.2 cm. wide, densely pubescent; seeds dark brown.

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[1] Bull. Acad. Brux. 10 [2]: 198. 1843.

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3. **Dolicholus discolor** (Mart. & Gal.) Rose, Contr. U. S. Nat. Herb. **10**: 101. 1906.

Rhynchosia discolor Mart. & Gal. Bull. Acad. Brux. **10**[2]: 198. 1843.

Rhynchosia australis Rose, Contr. U. S. Nat. Herb. **8**: 48. 1903. Not *R. australis* Benth. 1864.

Rhynchosia cuernavacana Rose, Contr. U. S. Nat. Herb. **8**: 313. 1905.

Dolicholus cuernavacanus Rose, Contr. U. S. Nat. Herb. **10**: 101. 1906.

Durango to Morelos and Chiapas; perhaps also in Sonora; type from Oaxaca. Guatemala.

Leaflets mostly deltoid-ovate, 3.5 to 9 cm. long; flowers large and showy, in long racemes.

4. **Dolicholus longeracemosus** (Mart. & Gal.) Rose, Contr. U. S. Nat. Herb. **10**: 101. 1906.

Rhynchosia longeracemosa Mart. & Gal. Bull. Acad. Brux. **10**[2]: 198. 1843.

Tamaulipas and Nuevo León to Oaxaca and Guerrero; type from Veracruz. Central America.

Plants scandent, herbaceous or suffrutescent; flowers yellow, in long racemes; seeds mottled with light and dark brown.

Perhaps not distinct from *D. reticulatus* (Swartz) Millsp., of the West Indies.

5. **Dolicholus nigropunctatus** (S. Wats.) Rose, Contr. U. S. Nat. Herb. **10**: 101. 1906.

Rhynchosia nigropunctata S. Wats. Proc. Amer. Acad. **22**: 408. 1887.

Veracruz and Jalisco; type from Guadalajara.

Plants scandent; petals yellow within, brownish outside.

6. **Dolicholus potosinus** (T. S. Brandeg.) Standl.

Rhynchosia potosina T. S. Brandeg. Univ. Calif. Publ. Bot. **4**: 181. 1911.

San Luis Potosí; type from Guascama.

Plants scandent, very viscid.

It is probable that this is not distinct from *D. nigropunctatus*.

7. **Dolicholus minimus** (L.) Medic. Vorles. Churpf. Phys. Ges. **2**: 354. 1787.

Dolichos minimus L. Sp. Pl. 726. 1753.

Rhynchosia minima DC. Prodr. **2**: 385. 1825.

Rhynchosia mexicana Hook. & Arn. Bot. Beechey Voy. 287. 1836–39.

Baja California and Sonora to Zacatecas, Yucatán, and Chiapas. Widely distributed in the tropics of both hemispheres.

Slender vine, herbaceous or suffrutescent; flowers small, yellow, often striped with red outside; seeds dark brown or black. "Frijolillo" (Cuba).

This has been reported from Yucatán as *Galactia multiflora* Robinson.

8. **Dolicholus phaseoloides** (Swartz) Kuntze, Rev. Gen. Pl. **3**[2]: 62. 1898.

Glycine phaseoloides Swartz, Prodr. Fl. Ind. Occ. 105. 1788.

Glycine precatoria Willd. Enum. Pl. **2**: 755. 1809.

Rhynchosia phaseoloides DC. Prodr. **2**: 385. 1825.

Rhynchosia precatoria DC. Prodr. **2**: 385. 1825.

Rhynchosia erythrinoides Schlecht. & Cham. Linnaea **5**: 587. 1830.

Dolicholus vailiae Rose, Contr. U. S. Nat. Herb. **10**: 101. 1906.

Sonora to San Luis Potosí, Veracruz, and Oaxaca. Widely distributed in tropical America.

Plants scandent, herbaceous or suffrutescent; flowers small, yellow, striped with brown; seeds particolored, half black and half scarlet. "Frijolillo" (Veracruz); "peonía" (Jalisco, San Luis Potosí); "negritos" (San Luis Potosí, Guerrero, Jalisco); "atecuixtli" (Nahuatl, "crab-eyes"); "colorín chiquito" (Guerrero, Morelos, Durango, Oaxaca); "ojo de cangrejo" (Guerrero, Morelos, etc.); "pulguitas" (Guerrero, Oaxaca); "ojo de zanate" (Sinaloa); "frijol

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de chintlatahua" (Oaxaca, *Reko*); "colorincito," "ojo de chanata" (Durango, *Patoni*); "ojitos de picho" (Tabasco, *Rovirosa*); "senecuilche," "xenecuilche," "pipilzintli" (*Nueva Farmacopea Mexicana*); "purensapichu" (Michoacán, Tarascan, *León*); "peronilla" (Colombia);; "bejuco de paloma," "peronías" (Porto Rico); "fruta de pitillo" (Guatemala, Honduras, *Blake*).

The handsome seeds are sometimes used as beads. The seeds are believed popularly to be poisonous and to cause a kind of insanity.

42. ERYTHRINA L. Sp. Pl. 706. 1753.

REFERENCE: Standley, The Mexican and Central American species of *Erythrina*, Contr. U. S. Nat. Herb. 20: 175–182. 1919.

Trees or shrubs, rarely herbs, usually with spiny branches; leaves pinnately 3-foliolate; flowers in axillary or terminal racemes, showy, red or reddish; standard petal large or elongate, the other petals small, the wings sometimes wanting; fruit stipitate, linear, bivalvate.

The species are very common in many parts of Mexico, and their properties are well known there, but in literature there has been great confusion concerning the specific names. The larger forms are often planted as hedges because of their showy flowers and well-armed branches. Most of the species, unfortunately, flower when devoid of leaves. The plants were used for hedges by the early inhabitants of Mexico, and they are sometimes planted now for coffee shade. Branches take root readily when placed in the ground. The wood is very soft and light and is used for corks, for carving small figures and images, and for various other purposes. The bark is said to yield a yellow dye. The succulent flowers are often cooked and eaten as a vegetable or prepared as a salad.

The handsome seeds, usually of various shades of red, are strung as necklaces, and also used by children in games. They were employed by the early Mexicans in a game, somewhat like dice, known as "patol." It is of interest to find that this name is now employed by the Hopi and other Pueblo Indians for a stick-dice game.

The seeds of one of the Mexican species have been studied by Altamirano, who found in them erythroidine, a powerful paralyzant of the motor system, erythroresin, an emetic, coralin, and erythric acid. The extract has been suggested as a substitute for curare. The poisonous properties of the seeds are well known in Mexico, and they are used to destroy noxious animals. They have been employed also as a hypnotic agent. Species of *Erythrina* growing in other regions are known to have poisonous seeds, as in the case of the Javan *E. lithosperma* Blume, from whose seeds a tetanizing alkaloid, hypaphorine, has been extracted.

The bark and stems have similar poisonous properties, and they are employed in tropical America to stupefy fish. From the bark an alkaloid, erythrine, has been extracted, which has a powerful effect on the nervous system. In Brazil the bark is employed in small doses as a hypnotic, purgative, and diuretic. The roots are used in Mexico for their supposed sudorific properties. The leaves are reputed emmenagogue, and a decoction of the flowers is used in treating chest affections. The juice of the stems is applied to scorpion stings.

A large number of vernacular names are reported from Mexico, but in most cases the specific application is doubtful. The usual names for the seeds are "colorín" and "patol" (from the Nahuatl, *patolli*); for the flowers "pitos." The following names are listed in literature: "Zompantli," "zompancle," "zompantle," "zumpantle," "tzompantli," "tzompantle" (from the Nahuatl *tzon-pantli*, "hair-banner"; also *tzon-pan-cuahuitl*, "hair-banner-tree");

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"cozquelite" (*Reko*); "purenchequa," "pureque" (Michoacán, Tarascan); "tzinacanquahuitl"; "chijol" (from the Nahuatl *chi-xo-lli*, "swollen-pod," *Reko*); "chocolín" (seeds); "pichoco"; "jiquimite," "iquimite"; "peonía" (Jalisco, Chihuahua); "chilicote" (Chihuahua); "chottza," "demthy" (Otomí, *Buelna*).

One species of doubtful determination is figured, without description, by Hernández[1] under the name "macayxtli."

Standard petals very broad, oval. Calyx bilobate; seeds brown. 1. E. breviflora.

Standard narrow, linear or linear-oblong.
- Fruit and ovary aculeate.
  - Calyx dentate ..... 2. E. setosa.
  - Calyx cleft on one side at the apex, not dentate ..... 3. E. leptorhiza.
- Fruit and ovary not aculeate.
  - Calyx cleft on one side at the apex, or conspicuously bilobate.
    - Calyx cleft on one side at the apex ..... 4. E. rubrinervia.
    - Calyx bilobate ..... 5. E. montana.
  - Calyx truncate.
    - Standard densely lanate or tomentulose.
      - Seeds about 8 mm. long; standard 7 cm. long; fruit deeply constricted between the seeds ..... 6. E. lanata.
      - Seeds about 12 mm. long; standard 5 to 5.5 cm. long; fruit shallowly constricted between the seeds ..... 7. E. occidentalis.
    - Standard glabrous or nearly so.
      - Leaflets, at least the terminal ones, conspicuously sinuate-lobate. 8. E. herbacea.
      - Leaflets never lobate.
        - Seeds about 15 mm. long; leaflets usually rounded or very obtuse at apex ..... 9. E. flabelliformis.
        - Seeds about 10 mm. long; leaflets usually acute or acuminate at apex.
          - Standard 8 cm. long; fruit deeply constricted between the seeds; leaflets aculeate beneath ..... 10. E. goldmanii.
          - Standard 6.5 cm. long or shorter; fruit only slightly constricted between the seeds; leaflets not aculeate ..... 11. E. americana.

1. **Erythrina breviflora** DC. Prodr. 2: 413. 1825.

Erythrina latiflora Sessé & Moc. Pl. Nov. Hisp. 55. 1887.

Erythrina petraea T. S. Brandeg. Zoe 5: 247. 1908.

Jalisco to Morelos and Puebla; type from Ayacapixtla.

Shrub, 3 to 5 meters high, usually with spiny stems; leaflets 8 to 19 cm. long, broadly rhombic, pubescent beneath and often aculeolate along the veins, short-pointed; racemes short, rather few-flowered; banner about 3 cm. long; seeds brown, about 17 mm. long.

Specimens from San Luis Tultitlanapa, Puebla, are remarkable in having leaflets only 2 to 3.5 cm. long, but the material appears to be properly referable to this species. The shrub flowers when in full leaf.

2. **Erythrina setosa** Mart. & Gal. Bull. Acad. Brux. 10[2]: 194. 1843.

Mountains of Oaxaca and perhaps elsewhere; type from Regla and the eastern cordillera of Oaxaca.

Stems probably always herbaceous, about 60 cm. high, prickly, nearly glabrous; leaflets 6 to 12 cm. long, acute or acutish, glabrous or nearly so, aculeolate

[1] Thesaurus 382. 1651.

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beneath along the veins; racemes short and dense, on very long peduncles; banner 4.5 to 6 cm. long, glabrous.

Erythrina horrida DC.[1] is probably the older name for the species. It was based upon one of Sessé and Mociño's plates which, however, is too poor for certain identification. It is possible that *E. horrida* is rather to be referred to *E. leptorhiza*.

3. **Erythrina leptorhiza** DC. Prodr. **2**: 413. 1825.

Michoacán to Hidalgo and Mexico.

Stems probably always herbaceous, 30 to 60 cm. high, usually prickly; leaflets 4 to 13 cm. long, acute or obtuse, puberulent or glabrate, often aculeolate beneath along the veins, the venation usually prominent and reticulate; banner 7 to 8 cm. long; fruit 2 to 4-seeded, slightly constricted between the seeds, densely aculeate; seeds nearly black, about 1.5 cm. long. "Patol," "colorín negro" (Michoacán); "cochizquilitl" (*Urbina*).

The roots are thick and fleshy or somewhat woody. The name *Erythrina leptocalyx* Rose was applied to specimens of this species, and has appeared in print, but it has never been properly published.

4. **Erythrina rubrinervia** H. B. K. Nov. Gen. & Sp. **6**: 434. 1823.

Oaxaca, Chiapas, and Veracruz. Guatemala to Colombia; Cuba; type from Fusagasugá, Colombia.

Shrub or tree, 2.5 to 9 meters high, with broad crown, the branches spiny or unarmed; leaflets 6 to 18 cm. long, usually acute or acuminate, glabrous or nearly so, paler beneath; banner 7 to 8.5 cm. long; fruit strongly constricted between the seeds; seeds 8 to 10 mm. long, scarlet. "Pito" (Guatemala).

5. **Erythrina montana** Rose & Standl. Contr. U. S. Nat. Herb. **20**: 179. 1919.

Durango to Jalisco; type from the Sierra Madre near Santa Teresa, Tepic.

Stems probably always herbaceous, 60 cm. high, unarmed; leaflets 4 to 13 cm. long, rounded to acute at apex, glabrous or nearly so, conspicuously reticulate-veined, usually minutely aculeolate beneath along the veins; standard 5 to 7 cm. long, glabrous; fruit 1 to 4-seeded, slightly constricted between the seeds.

The flowers seem to vary considerably in color, being purplish green, or amber-colored tinted with salmon.

6. **Eyrthrina lanata** Rose, U. S. Dept. Agr. N. Amer. Fauna **14**: 81. *f. 1.* 1899.

Guerrero and Oaxaca; type from Acapulco, Guerrero.

Shrub with spiny branches; leaflets 4 to 7 cm. long or larger, pointed, glabrous or nearly so, paler beneath; seeds scarlet, 7 to 8 mm. long.

7. **Erythrina occidentalis** Standl. Contr. U. S. Nat. Herb. **20**: 180. 1919.

Sinaloa and Tepic; type from Mazatlán, Sinaloa.

Shrub or small tree, often 5 to 6 meters high, with gray spiny branches, leafless at anthesis; leaflets 5 to 17 cm. long, acute or acutish, tomentulose beneath when young but soon glabrate; racemes dense, elongate; flowers rose or red; fruit 5 to 10-seeded; seeds scarlet, about 12 mm. long. "Colorín" (Sinaloa).

The wood is used to some extent, and is said to be durable in dry places. Bottle stoppers are often made from it.

8. **Erythrina herbacea** L. Sp. Pl. 706. 1753.

Tamaulipas and San Luis Potosí. Southeastern United States.

Shrub or small tree, 1 to 3 meters high or larger, with few stiff branches, the trunk very spiny; leaflets 4 to 8 cm. long, usually acute or acutish, glabrous or nearly so, usually somewhat 3-lobed; banner 5 to 5.5 cm. long, red or reddish;

[1] Prodr. **2**: 413. 1825.

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seeds 5 to 10, scarlet, about 1 cm. long. "Colorín," "patol colorín" (Tamaulipas); "patol" (San Luis Potosí).

In San Luis Potosí the seeds are used to poison rats and dogs. The soft wood is employed for making figures of saints, etc. In Mexico this species is apparently always a shrub or tree, but in Florida it is often herbaceous and sometimes a scandent shrub.

9. **Erythrina flabelliformis** Kearney, Trans. N. Y. Acad. **14**: 32. 1894.

Erythrina purpusi T. S. Brandeg. Zoe **5**: 158. 1903.

Baja California to Sonora, San Luis Potosí, and Morelos. Southern Arizona (type from Fort Huachuca) and New Mexico.

Shrub or small tree with spiny branches; leaflets 4 to 8 cm. long, rarely acute, usually broader than long, tomentulose beneath at first but soon glabrate; racemes usually dense and many-flowered; banner red, 4 to 6 cm. long; fruit sometimes 30 cm. long, with 2 to many seeds, rather shallowly constricted between the seeds; seeds usually dark red. "Colorín," "chilicote" (Durango); "coralina" (Baja California).

This is no doubt one of the species to which the name *E. coralloides* has been frequently applied. Brandegee[1] states that in Baja California the boys play with the large red seeds, for which they employ the name "chilacayote," a name used also for the seeds of species of *Marah* or *Megarrhiza*, of the family Cucurbitaceae. Palmer reports that in Durango the seeds are used as a remedy for toothache, and the wood for carving figures of saints, etc.

10. **Erythrina goldmanii** Standl. Contr. U. S. Nat. Herb. **20**: 181. 1919.

Chiapas; type from San Vicente.

Branches spiny; leaflets 4 to 9 cm. long, pilose when young but soon glabrate, armed beneath with a few recurved prickles; fruit several-seeded; seeds about 1 cm. long, scarlet.

11. **Erythrina americana** Mill. Gard. Dict. ed. 8. *Erythrina* no. 5. 1768.

Erythrina carnea Ait. Hort. Kew. **3**: 8. 1789.

Mexico and Veracruz to Chiapas and Yucatán; type from Veracruz.

Shrub or tree, sometimes 9 meters high, with spiny branches; leaflets 7 to 22 cm. long, glabrous or nearly so; flowers red; fruit few or many-seeded; seeds 10 to 12 mm. long, usually scarlet. "Colorín" (Puebla); "chacmolché" (Yucatán, Maya); "pito" (Veracruz).

This is probably the species for which the names "chontal," "madre chontal," "madre cacao," and "madre brava" are used in Tabasco. It is probable also that *E. coralloides* DC.[2] is a synonym of this species, although possibly that is rather the proper name for *E. flabelliformis*. De Candolle's name was based upon one of Sessé and Mociño's drawings, but the tracing of the latter seen by the writer is too imperfect for definite identification. *E. americana* has been reported from Mexico as *E. corallodendron* L., a West Indian species with red and black seeds which is not known to occur in Mexico.

DOUBTFUL SPECIES.

ERYTHRINA DIVARICATA DC. Prodr. **2**: 414. 1825. Based upon one of Sessé and Mociño's plates, which is said to represent a Mexican plant.

ERYTHRINA LONGIPES DC. Prod. **2**: 413. 1825. This also was based upon a plate of Sessé and Mociño.

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[1] T. S. Brandegee, Flora of the Cape Region of Baja California, Proc. Calif. Acad. II. **3**: 108–227. 1891.

[2] Prodr. **2**: 413. 1825.

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ERYTHRINA PRINCEPS Dietr. in Otto & Dietr. Allg. Gartenz. 2: 305. 1834. Described from Mexico. Not identifiable from the description.

ERYTHRINA ROSEA Dietr. in Otto & Dietr. Allg. Gartenz. 2: 253. 1834. Described from Mexico. Identity doubtful.

43. GALACTIA Adans. Fam. Pl. 2: 322. 1763.

Scandent or erect herbs or shrubs; leaves pinnately 3 or 5-foliolate, the leaflets large or small; flowers small or large, usually racemose; fruit linear, bivalvate.

Leaflets 4 to 9 cm. wide. Plants scandent ..... 1. G. viridiflora.
Leaflets less than 3.5 cm. wide.
  Flowers in axillary clusters ..... 2. G. brachystachya.
  Flowers racemose.
    Racemes stout, dense, sessile, mostly shorter than the leaves. 3. G. multiflora.
    Racemes slender, interrupted, pedunculate, mostly longer than the leaves.
      Plants erect; leaflets acute or acuminate ..... 4. G. incana.
      Plants scandent or trailing; leaflets often obtuse.
        Leaflets glabrous on the upper surface ..... 5. G. acapulcensis.
        Leaflets variously pubescent on the upper surface.
          Leaflets bright green on the upper surface, not closely sericeous on either surface ..... 6. G. striata.
          Leaflets grayish, closely sericeous on both surfaces.
            Leaflets white beneath with a soft silky pubescence, oval or ovate. 7. G. argentea.
            Leaflets grayish beneath with rather stiff pubescence, usually oblong ..... 8. G. wrightii.

1. **Galactia viridiflora** (Rose) Standl.
Odonia viridiflora Rose, Contr. U. S. Nat. Herb. 10: 103. *pl. 33.* 1906.
Guerrero to Morelos; type from Iguala, Guerrero.
Scandent shrub; leaflets about as broad as long, pubescent; flowers greenish white, 1.2 cm. long, in very long racemes.

2. **Galactia brachystachya** Benth. Ann. Wien. Mus. Naturg. 2: 127. 1838.
Coahuila to Guerrero and Oaxaca; type from Zimapán, Hidalgo.
Slender scandent shrub; leaflets oblong or oval, 1 to 4 cm. long; flowers purplish, 1 cm. long; fruit about 2 cm. long and 6 mm. wide.

3. **Galactia multiflora** Robinson, Proc. Amer. Acad. 29: 315. 1894.
Jalisco to Oaxaca; type from Tequila, Jalisco.
Erect or scandent shrub, sometimes 1.5 meters high; leaflets oblong to orbicular, 2 to 5 cm. long; flowers purplish, about 1.2 cm. long; fruit 3 to 4 cm. long, 5 to 6 mm. wide.

4. **Galactia incana** (Rose) Standl.
Odonia incana Rose, Contr. U. S. Nat. Herb. 10: 102. *pl. 32.* 1906.
Sinaloa and Tepic; type collected between Aguacate and Dolores, Tepic.
Leaflets ovate or oblong, 3.5 to 7 cm. long; racemes often 25 cm. long.

5. **Galactia acapulcensis** Rose, Contr. U. S. Nat. Herb. 5: 137. 1897.
Baja California, Guerrero, and Morelos; type from Acapulco, Guerrero.
Leaflets oblong or oval, 3 to 7 cm. long, thin; flowers 1 cm. long.
Perhaps not distinct from *G. striata.*

6. **Galactia striata** (Jacq.) Urban, Symb. Antill. 2: 320. 1900.
Glycine striata Jacq. Hort. Vindob. 1: 32. *pl. 76.* 1770.
Galactia brevistyla Schlecht. Linnaea 12: 288. 1838.

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Odonia retusa Rose, Contr. U. S. Nat. Herb. 10: 102. 1906.

Chihuahua to Jalisco, Chiapas, and Yucatán. Widely distributed in tropical America.

Plants slender, scandent, sometimes to a height of 3 meters, herbaceous or suffrutescent; flowers small, purple.

This has been reported from Mexico as *G. tenuiflora* Willd.

7. **Galactia argentea** T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 181. 1915.

Known only from the type locality, Cerro de Picacho, Oaxaca.

Scandent shrub, densely silvery-sericeous throughout; leaflets oval or oblong, 2 to 4 cm. long; flowers purple.

8. **Galactia wrightii** A. Gray, Pl. Wright. 1: 44. 1852.

Galactia tephrodes A. Gray, Pl. Wright. 2: 34. 1853.

Chihuahua and Sonora. Western Texas (type locality) to southern Arizona.

Plants slender, scandent, sericeous; leaflets oblong or elliptic, 2 to 5 cm. long; fruit about 4.5 cm. long, 4 to 5 mm. wide, pubescent.

44. CAJANUS DC. Cat. Hort. Monsp. 85. 1813.

1. **Cajanus indicus** Spreng. Syst. Veg. 3: 248. 1826.

Cytisus cajan L. Sp. Pl. 739. 1753.

Cajanus cajan Millsp. Field Mus. Bot. 2: 53. 1900.

Cultivated in Mexico and sometimes escaping. Native country not certainly known, but perhaps tropical Asia; widely cultivated and naturalized in tropical regions.

Erect shrub or herb, 1 to 3 meters high; leaves pinnately 3-foliolate, the leaflets ovate or oblong, 3 to 8 cm. long, acute, puberulent and gland-dotted beneath; flowers large, yellow, often striped or spotted with red, in short racemes; fruit oblong-linear, bivalvate, pilose; seeds small, gray or brownish. "Frijol de palo" (Nicaragua, Panama, Costa Rica); "frijolillo" (Costa Rica); "garbanzo falso" (Nicaragua); "guandú" (Costa Rica, Porto Rico); "gandul," "gandures" (Porto Rico); "timolillo," "quinbolillo" (Costa Rica); "chicharros," "quinconcho" (Venezuela); "frijol guandus" (Colombia).

The English name "pigeon-pea" is said to have been given because pigeons are fond of the seeds. The plant is extensively cultivated in some tropical regions for its edible seeds, and in India it is said to hold third rank among the leguminous plants cultivated for food. The seeds are eaten either ripe or green. When cultivated the plant is usually treated as an annual, but if not cut it becomes a truly woody shrub. It is often grown for forage, and in Madagascar the leaves have been utilized as food for silkworms. In Bengal the plant has been grown as a host plant for lac insects. The stems are used in Asia for roofs and baskets, and they have been burnt into charcoal for gunpowder. Diuretic, astringent, antidysenteric, detersive, laxative, and vulnerary properties are ascribed to the plant. With regard to the flowers there are two chief varieties, one with yellow petals, the other with the standard purplish outside.

45. MUCUNA Adans. Fam. Pl. 2: 325. 1763.

Scandent herbs or shrubs; leaves pinnate, 3-foliolate; flowers large, fasciculate or racemose; fruit thick and hard, usually covered with stinging hairs.

Some species of the genus are grown extensively as forage plants.

Fruit with transverse crests ..... 1. **M. sloanei.**

Fruit without transverse crests.

Fruit 4.5 to 5 cm. wide, flat; leaflets densely lustrous-sericeous beneath. 2. **M. argyrophylla.**

Fruit less than 2 cm. wide, very thick; leaflets sparsely sericeous beneath. 3. **M. pruriens.**

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1. **Mucuna sloanei** Fawe. & Rendle, Journ. Bot. Brit. & For. 55: 36. 1917.

Michoacán and Guerrero to Veracruz and Oaxaca. Tropical America and western Africa.

Scandent shrub or herb; leaflets about 9 cm. long, silvery-sericeous beneath; flowers large, yellow; fruit 4 to 5 cm. wide, densely covered with bristly hairs; seeds subglobose, dark brownish gray, 2.5 cm. in diameter. "Pica-pica" (Oaxaca, Veracruz); "ojo de venado" (Guerrero, Veracruz, Oaxaca, Panama); "ojo de borrico" (Veracruz); "ojo de buey" (Oaxaca, Porto Rico); "matos del monte," "matos" (Porto Rico).

The seeds were eaten by the Caribs of the West Indies, and were formerly used in Jamaica for the manufacture of buttons and snuff-boxes. In Mexico they are sometimes worn as amulets. They are said also to be purgative and diuretic. The leaves are reported to yield a black dye. The hairs of the pods cause intense irritation when in contact with the skin. Formerly these hairs, like those of *M. pruriens*, mixed with molasses, formed a mixture of wide usage, administered internally, for the destruction of intestinal parasites in man. The hairs are softened by soaking in molasses, and are said to have no injurious effect upon the lining of the alimentary canal.

This is probably the plant reported from Mexico by Sessé and Mociño[1] as *Dolichos altissimus*.

2. **Mucuna argyrophylla** Standl., sp. nov.

Chiapas and Oaxaca; type from Ocuilapa, Chiapas (*Nelson* 3060; U. S. Nat. Herb. no. 234283).

Young branches densely appressed-pilose; petioles slender, 6.5 to 10 cm. long, the petiolules 5 to 8 mm. long; leaflets 8.5 to 16 cm. long, 5.5 to 10 cm. wide, abruptly short-acuminate at apex, the terminal one broadly elliptic-oval or rounded-oval, rounded at the base, the lateral ones usually smaller, oblique, very unequal at base, the leaflets thin, hispidulous on the upper surface, beneath densely silvery-sericeous with lustrous hairs; peduncles often 50 cm. long or longer, slender, the racemes dense, 2.5 to 6.5 cm. long, the pedicels recurved, 4 to 5 cm. long; calyx about 12 mm. long and broad, densely sericeous, the teeth very short, obtuse; standard petal 2 cm. wide (when flattened out), the blade 2 cm. long, the claw 5 mm. long; wings about as long as the standard, 7 to 8 mm. wide; keel 4.5 cm. long, about 1 cm. wide, rounded at apex; fruit about 20 cm. long and 4.5 cm. wide, 2 to 4-seeded, densely hispid with short brown hairs, sessile, the valves thin, smooth.

3. **Mucuna pruriens** (L.) DC. Prodr. 2: 405. 1825.

Dolichos pruriens L. Syst. Nat. ed. 10. 2: 1162. 1750.

Veracruz. Widely distributed in the tropics of both hemispheres.

Scandent or procumbent shrub or herb; flowers dark purple, in pendent racemes; fruit 7 to 10 cm. long, very densely covered with stinging hairs; seeds small, blackish brown. "Pica-pica" (Veracruz, Costa Rica, Cuba); "guzano de pica-pica" (Nicaragua).

The English names are "cowage" and "cowitch." In India the powdered seeds are said to be used as an aphrodisiac, and the green seeds are cooked and eaten. The seeds are said to be used sometimes as a substitute for coffee.

46. BRADBURYA Raf. Fl. Ludov. 104. 1817.

Plants scandent, herbaceous or suffrutescent; leaves pinnate, 3-foliolate, or sometimes unifoliolate; flowers large, showy, the axillary peduncles with one or more flowers; fruit linear, bivalvate.

One or two herbaceous species also occur in Mexico.

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[1] Pl. Nov. Hisp. 117. 1887.

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Leaves unifoliolate, the leaflets hastate.....1. B. sagittata.
Leaves 3-foliolate.
Leaflets hastate.....2. B. schottii.
Leaflets not hastate.
Fruit 8 to 10 mm. wide; upper calyx lobes nearly obsolete..3. B. plumieri.
Fruit 4 to 6 mm. wide; upper calyx lobes equaling or longer than the tube.
Upper calyx lobes about as long as the tube; bracts densely sericeous. 4. B. pubescens.
Upper calyx lobes much longer than the tube; bracts puberulent. 5. B. virginiana.

1. **Bradburya sagittata** (Humb. & Bonpl.) Rose, Contr. U. S. Nat. Herb. 8: 46. 1903.
Glycine sagittata Humb. & Bonpl.; Willd. Enum. Pl. 757. 1809.
Centrosema hastatum Benth. Ann. Wien. Mus. Naturg. 2: 120. 1838.
Centrosema dubium Hemsl. Biol. Centr. Amer. Bot. 1: 294. 1880.
Veracruz to Colima and Oaxaca. Costa Rica; Colombia (type locality).
Plants herbaceous or suffrutescent; leaflets 6 to 11 cm. long, acuminate, glabrate; petiole winged; flowers about 4.5 cm. long; fruit 8 to 14 cm. long, 6 to 8 mm. wide, with a long slender beak.

2. **Bradburya schottii** Millsp. Field Mus. Bot. 1: 364. 1898.
Centrosema schottii K. Schum. in Just's Bot. Jahresb. 26 [1]: 353. 1900.
Yucatán; type from Nohpat.
Plants scandent to a height of 3 meters; flowers 3.5 cm. long; fruit 12.5 to 15 cm. long, 6 mm. wide.

3. **Bradburya plumieri** (Turp.) Kuntze, Rev. Gen. Pl. 1: 164. 1891.
Clitoria plumieri Turp.; Pers. Syn. Pl. 2: 303. 1807.
Centrosema plumieri Benth. Ann. Wien. Mus. Naturg. 2: 118. 1838.
Guerrero to Veracruz, Yucatán, and Chiapas. Widely distributed in tropical America.
Scandent shrub or herb; leaflets suborbicular to oval-oblong, 3.5 to 10 cm. long, apiculate or short-acuminate; flowers 4.5 to 5 cm. long, dark purple to pinkish white; fruit 10 to 18 cm. long. "Frijolillo," "patitos" (Tabasco); "mariposa" (Campeche).

4. **Bradburya pubescens** (Benth.) Kuntze, Rev. Gen. Pl. 1: 164. 1891.
Centrosema pubescens Benth. Ann. Wien. Mus. Naturg. 2: 119. 1838.
Clitoria schiedeana Schlecht. Linnaea 12: 284. 1838.
? *Clitoria grandiflora* Mart. & Gal. Bull. Acad. Brux 10 [2]: 189. 1843.
Bradburya schiedeana Rose, Contr. U. S. Nat. Herb. 8: 46. 1903.
Guerrero to San Luis Potosí, Veracruz, and Chiapas. Widely distributed in tropical America.
Plants scandent, herbaceous or suffrutescent; leaflets elliptic or ovate, 4 to 10 cm. long, pubescent, short-acuminate; flowers 3 to 4 cm. long, yellowish or purple; fruit about 15 cm. long. "Flor de pito" (Porto Rico).

5. **Bradburya virginiana** (L.) Kuntze, Rev. Gen. Pl. 1: 164. 1891.
Clitoria virginiana L. Sp. Pl. 753. 1753.
Centrosema virginiana Benth. Ann. Wien. Mus. Naturg. 2: 120. 1838.
Tamaulipas to Yucatán, Chiapas, and Oaxaca. Widely distributed in tropical America; southern United States; western Africa.
Plants usually herbaceous but sometimes scandent to a height of 6 meters; leaflets ovate or oblong, 3 to 7.5 cm. long, bright green, acute; flowers 2 cm. long, blue or purplish; fruit 10 to 15 cm. long. "Sonajera azul," "hierba de bulla," "chochito," "crica de negra" (Porto Rico).

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Various medicinal uses are reported from Porto Rico for the plant. Grosourdy states that the flowers yield a blue dye.

47. CALOPOGONIUM Desv. Ann. Sci. Nat. 9: 423. 1826.

Another species, *C. galactoides* Benth., a herbaceous plant, also occurs in Mexico.

1. **Calopogonium caeruleum** (Benth.) Hemsl. Biol. Centr. Amer. Bot. 1: 301. 1880.

Stenolobium caeruleum Benth. Ann. Wien. Mus. Naturg. 2: 125. 1838.

Tepic to Veracruz and Chiapas. Central America, West Indies, and South America; type from Brazil.

Scandent or trailing shrub or herb; leaves pinately 3-foliolate, the leaflets rhombic, obtuse or acute; flowers small, violet, in long spikelike racemes; fruit flattened, 5 to 7 cm. long, 8 mm. wide.

48. ANDIRA Lam. Encyl. 1: 171. 1783.

Unarmed trees; leaves pinnate, the leaflets large or of medium size; flowers pink or violet, paniculate; fruit drupaceous, ovoid or obovoid, indehiscent.

The seeds of some South American species have anthelmintic properties.

Leaflets glabrous beneath, acute or abruptly acuminate; flowers about 1 cm. long ..... 1. A. jamaicensis.

Leaflets densely tomentose beneath, rounded or very obtuse at the apex; flowers about 1.8 cm. long ..... 2. A. galeottiana.

1. **Andira jamaicensis** (W. Wright) Urban, Symb. Antill. 4: 298. 1905.

Geoffraea jamaicensis W. Wright, Phil. Trans. Lond. 67: 512. 1777.

Geoffraea inermis Swartz, Prodr. Veg. Ind. Occ. 106. 1788.

Andira excelsa H. B. K. Nov. Gen. & Sp. 6: 385. 1823.

Andira inermis H. B. K. Nov. Gen. & Sp. 6: 385. 1823.

Michoacán to Chiapas; reported from Tabasco and Yucatán. West Indies, Central America, South America, and western Africa; type from Jamaica.

Tree, sometimes 30 meters high; leaflets usually 9 or 11, oblong or ovate, large, acuminate; flowers small, paniculate, purple or reddish violet, sometimes pink; fruit rounded, oval, or obovate, 2.5 to 4 cm. long or larger. "Cuilimbuca" (Mochoacán, Guerrero); "yabo," "yaba" (Yucatán, Cuba); "maca colorada," "pacay," "macallo," "moca" (Tabasco); "macayo" (Tabasco, Oaxaca); "pilón" (Guiana); "moca," "moca blanca" (Porto Rico); "guacamayo" (Guatemala, Honduras, *Blake*).

Wood hard and durable, varying from yellowish to dark brown or even black, susceptible of a high polish, the specific gravity reported as 0.748 and 0.880. In Tabasco it is valued for construction purposes. The tree has a disagreeable odor. In Porto Rico it is sometimes planted for coffee shade. The bark and seeds are used as a purgative, vermifuge, febrifuge, or anthelmintic, but large doses are said to be dangerous, producing delirium or even death. The seeds are said to contain a poisonous alkaloid.

2. **Andira galeottiana** Standl. Contr. U. S. Nat. Herb. 20: 217. 1919.

Veracruz and Puebla; type from Catemaco, Veracruz.

Leaflets 5 to 13, oblong to obovate-oblong, 3 to 13 cm. long, glabrate on the upper surface; racemes dense, 6 to 9 cm. long, forming a large panicle; ovary glabrous. "Macayo" (Puebla).

49. AMERIMNON Jacq. Enum. Pl. Carib. 27. 1760.

Trees or shrubs, unarmed, often scandent; leaves pinnate, with numerous leaflets, rarely unifoliolate; flowers small, usually paniculate; fruit oblong or linear, flat, thin, indehiscent, 1 or few-seeded.

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Some of the Asiatic and South American species yield part of the rosewood of commerce.

Leaflet 1 ..... 1. A. brownii.
Leaflets 5 or more.
  Leaflets glabrous beneath ..... 2. A. granadillo.
  Leaflets thinly sericeous beneath.
    Leaflets 1.5 to 3 cm. long ..... 3. A. glabrum.
    Leaflets 3.5 to 5 cm. long ..... 4. A. glomeratum.

1. **Amerimnon brownii** Jacq. Enum. Pl. Carib. 27. 1760.

Dalbergia amerimnum Benth. Journ. Linn. Soc. Bot. 4: Suppl. 36. 1860.

Dalbergia brownii Urban, Symb. Antill. 4: 295. 1905.

Tamaulipas, Veracruz, and Oaxaca. Central America, West Indies, and South America.

Shrub, 3 to 4.5 meters high, often with long reclining branches; leaves ovate or oval, 3.5 to 7 cm. long, obtuse or acute, lustrous, glabrous; flowers white, in dense clusters. "Péndola" (Cuba).

2. **Amerimnon granadillo** Standl., sp. nov.

Oaxaca to Michoacán; type from El Tibor, Michoacán or Guerrero, altitude 100 meters (*Langlassé* 294; U. S. Nat. Herb. no. 385583).

Tree, the branchlets slender, glabrous; leaves glabrous, the rachis 9.5 to 18 cm. long, slender, glaucescent, the petiolules 2.5 to 3 mm. long; leaflets 7 to 11, elliptic-oval or ovate-oval, 3 to 7 cm. long, 1.7 to 4 cm. wide, rounded at base, obtuse or rounded-obtuse at apex, sometimes with a somewhat abrupt obtuse tip, thin, bright green and lustrous on the upper surface, paler beneath, the venation prominent and reticulate on both surfaces; cymes lax, few-flowered, the pedicels in fruit 4 to 5 mm. long, very stout; calyx persistent in fruit, thinly sericeous with short brown hairs, the lobes obtuse; fruit very flat and thin, 1 to 3-seeded, 8 to 15 cm. long, 1.7 to 2 cm. wide, sometimes slightly constricted in the middle, acuminate at apex, attenuate at base, lustrous, glabrous, reticulate-veined, the slender stipe 10 to 12 mm. long.

Collected also at Apango (Cerro Huatulco), Oaxaca, altitude 400 meters, October 10, 1917, by B. P. Reko (no. 3517).

Related to *Dalbergia retusa* Hemsl., a species of Panama, which is distinguished by the sericeous lower surface of the leaflets and broader, shorter fruit.

Amerimnon granadillo is a well-known forest tree of the west coast of Mexico, and there are several references to it in literature under the vernacular name of "granadillo." It is highly valued for use in cabinet work. A specimen of the wood has been forwarded by Dr. Reko. It is very heavy and hard, of a beautiful purple color, with broad stripes of purplish black; it takes a fine polish.

3. **Amerimnon glabrum** (Mill.) Standl.

Robinia glabra Mill. Gard. Dict. ed. 8. *Robinia* no. 5. 1768.

Dalbergia campeachiana Benth. Journ. Linn. Soc. Bot. 4: Suppl. 37. 1860.

Amerimnon campeachianum Kuntze, Rev. Gen. Pl. 1: 159. 1891.

Dalbergia purpusii T. S. Brandeg. Univ. Calif. Publ. Bot. 6: 501. 1919.

Veracruz, Morelos, and Oaxaca to Yucatán; type from Campeche.

Scandent shrub; leaflets about 9, oval, rounded at the apex, paler beneath; flowers small, white, in loose clusters; fruit 4 to 6 cm. long, 1 to 1.5 cm. wide, thin. "Cibix" (Yucatán, Maya); "bejuco de panune," "bejuco de estribo" (Oaxaca).

4. **Amerimnon glomeratum** (Hemsl.) Standl.

Dalbergia glomerata Hemsl. Diag. Pl. Mex. 8. 1878.

Known only from the type locality, Sierra Zongolica, Veracruz.

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Leaflets 11 or 13, ovate-oblong, obtuse; flowers smaller than those of the last species, in dense cymes.

50. PTEROCARPUS L. Sp. Pl. ed. 2. 1662. 1763.

Unarmed trees; leaves pinnate, with few large leaflets; flowers large, racemose or paniculate; fruit short and broad, compressed, 1 or 2-seeded, indehiscent.

Some of the Asiatic species yield gums which are used medicinally for diarrhoea, and also for dyeing and tanning. Others yield valuable woods.

Fruit sessile or nearly so, densely cinereo-puberulent; calyx densely puberulent, the lobes acute ..... 1. P. orbiculatus.
Fruit long stipitate; calyx lobes very obtuse.
Calyx densely pubescent; leaflets acutish or obtuse at apex. 2. P. acapulcensis.
Calyx glabrate; leaflets cuspidate-acuminate ..... 3. P. officinalis.

1. Pterocarpus orbiculatus DC. Prodr. 2: 418. 1825.

Amphymenium pubescens H. B. K. Nov. Gen. & Sp. 6: 380. 1823.

Pterocarpus amphymenium DC. Prodr. 2: 418. 1825.

Pterocarpus pubescens Spreng. Syst. Veg. 4: Cur. Post. 268. 1827. Not *P. pubescens* Poir. 1804.

Pterocarpus aphyllus Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 266. *pl. 16.* 1903.

Guerrero, Michoacán, Oaxaca, and Veracruz.

Tree, 6 to 8 meters high, with white bark; leaflets 3 to 7, large, variable in shape, nearly glabrous; flowers yellow, rather large, racemose; fruit suborbicular, 4 to 5 cm. broad, surrounded by a broad thin wing. "Llora sangre" (Guerrero); "guapahillo" (Michoacán).

Pterocarpus crispatus DC.[1] may be the same species. Its fruit is not known.

2. Pterocarpus acapulcensis Rose, Contr. U. S. Nat. Herb. 5: 143. 1897.

Veracruz, Guerrero, and Oaxaca; type from Acapulco, Guerrero.

Tree, 7 meters high or larger, with yellow flowers; leaflets pale beneath; fruit 5 to 6.5 cm. long. "Drago" (Guerrero, Oaxaca); "sangre de drago," "sangredrago" (Oaxaca).

This may be the species reported by Ramírez from Michoacán as *P. draco*, with the vernacular name "huahuauchi."

3. Pterocarpus officinalis Jacq. Stirp. Amer. 283. *pl. 183, f. 92.* 1763.

Pterocarpus draco L. Sp. Pl. ed. 2. 1662, in part. 1763.

Yucatán. Central America, West Indies, and northern South America.

Tree, sometimes 24 meters high, with yellow or yellowish brown flowers; wood dirty white, with a specific gravity of about 0.554. "Sangre de drago" (Guatemala, Nicaragua); "sangregado" (Nicaragua); "palo de pollo" (Porto Rico).

As in other species, when the bark is cut it exudes a blood-red juice that soon solidifies and forms a red resin which is insipid and inodorous. It was formerly used in medicine under the name of "dragon's-blood," and large amounts were at one time sent to Spain from Cartagena, Colombia.

51. DREPANOCARPUS Meyer, Prim. Fl. Esseq. 236. 1818.

Trees or shrubs sometimes scandent; leaves unequally pinnate, estipellate, the leaflets alternate; flowers purple or white, in short axillary racemes or in terminal panicles; fruit falcate, compressed, indehiscent, 1-seeded.

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[1] Prodr. 2: 418. 1825.

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Leaflets usually 7; standard petal sericeous.
Leaflets acuminate ..... 1. D. inundatus.
Leaflets rounded at apex ..... 2. D. lunatus.
Leaflets 25 to 30; standard petal glabrous ..... 3. D. mucronulatus.

1. **Drepanocarpus inundatus** Mart.; Benth. Ann. Naturhist. Hofmus. Wien 2: 96. 1838.

Veracruz and Chiapas. Central America to Brazil.

Shrub, usually scandent; leaflets 5 to 9, ovate to lance-oblong, 4 to 8 cm. long, glabrous or nearly so; flowers sessile.

2. **Drepanocarpus lunatus** (L. f.) Meyer, Prim. Fl. Esseq. 238. 1818.

Pterocarpus lunatus L. f. Suppl. Pl. 317. 1781.

Reported from Veracruz. Central America, West Indies, South America, and western Africa.

Shrub, 2 to 5 meters high, armed with short recurved spines; leaflets oblong, 1.5 to 5 cm. long, with very numerous fine close nerves; flowers purple; fruit flat, short, strongly curved. Known in Porto Rico as "escambrón" or "palo de hoz."

3. **Drepanocarpus mucronulatus** Benth.; Hemsl. Diag. Pl. Mex. 8. 1878.

Known only from the type locality, Bolaños, Jalisco.

Leaflets oblong, 6 to 10 mm. long, mucronate, hirsute beneath; flowers short-pedicellate, 5 to 6 mm. long.

Of this Hemsley says, "A very distinct plant, perhaps the type of a new genus."

DOUBTFUL SPECIES.

DREPANOCARPUS ? CYATHIFORMIS DC. Prodr. 2: 420. 1825. Described from somewhere in Mexico. Probably a synonym of *Dalbergia monetaria* L. f., which is not known to occur in Mexico.

52. MACHAERIUM Pers. Syn. Pl. 2: 276. 1807.

Scandent shrubs or erect trees, usually armed with spines; leaves pinnate; flowers small or of medium size, racemose or paniculate; fruit compressed, samara-like, 1-seeded, indehiscent.

Some of the South American species yield valuable wood which forms part of the rosewood of commerce.

Leaflets acuminate, elliptic or ovate ..... 1. M. latifolium.
Leaflets rounded or retuse at the apex, oblong or obovate-oblong.
Leaflets 5 to 9 ..... 4. M. riparium.
Leaflets more than 9 in most of the leaves.
Inflorescence puberulent or with minute appressed hairs; leaflets mostly 1.5 to 2 cm. wide ..... 2. M. biovulatum.
Inflorescence setulose-pilose with stiff yellowish hairs; leaflets 6 to 8 mm. wide ..... 3. M. setulosum.

1. **Machaerium latifolium** (Benth.) Pittier, Contr. U. S. Nat. Herb. 20: 470. 1921.

Machaerium acuminatum latifolium Benth. Journ. Linn. Soc. Bot. 4: Suppl. 65. 1860.

Veracruz. Nicaragua and Costa Rica.

Shrub, probably scandent; leaflets 5 or 7, elliptic, 5 to 12 cm. long, glabrate; fruit 7 to 8 cm. long, glabrous, the thin wing 2 cm. wide or wider.

2. **Machaerium biovulatum** Micheli, Mém. Soc. Phys. Hist. Nat. Genève 34: 265. *pl. 15*. 1903.

Michoacán to Oaxaca; type from El Ocote. Guatemala.

Large scandent shrub, armed with short recurved spines; leaflets 3 to 5 cm. long, bright green, pale beneath, with numerous fine close nerves; flowers violet; fruit 5 to 6 cm. long, the wing 1.2 to 1.5 cm. wide.

It may be that two species are represented by the material referred here.

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3. **Machaerium setulosum** Pittier, Contr. U. S. Nat. Herb. **20**: 477. 1921.

Veracruz; type from Zacuapan.

Subscandent shrub; leaflets numerous, 2 to 3.5 cm. long, with fine parallel nerves, pubescent beneath; flowers violet.

4. **Machaerium riparium** T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 500. 1919.

Known only from the type locality, Zacuapan, Veracruz.

Leaflets oblong or elliptic, about 3 cm. long, glabrous; panicles ferruginous-pubescent; fruit glabrous, 6 cm. long, the wing 1.8 cm. wide.

The writer has seen no material of this species.

53. PLATYMISCIUM Vog. Linnaea 11: 198. 1837.

Trees or shrubs; leaves glabrous, estipellate, the leaflets few, opposite; racemes borne on new or old branches, solitary or fasciculate; corolla yellow, glabrous; fruit oblong, flat, submembranaceous, indehiscent.

Leaflets 3; rachis of the racemes glabrous ..... 1. P. trifoliolatum.
Leaflets 5; rachis of the racemes finely puberulent ..... 2. P. yucatanum.

1. **Platymiscium trifoliolatum** Benth. Journ. Linn. Soc. Bot. **4**: Suppl. 82. 1860.

Type collected between San Blas, Tepic, and Guadalajara, Jalisco.

Leaflets ovate-elliptic, acuminate, acute at base; racemes 7 to 13 cm. long, the flowers long-pedicellate, 10 to 12 mm. long; young fruit about 3.5 cm. long and 8 mm. wide.

2. **Platymiscium yucatanum** Standl., sp. nov.

Type from Izamal, Yucatán, flowering in February (*Gaumer* 377; U. S. Nat. Herb. no. 571629).

Tree, 24 meters high, the branchlets gray; leaves glabrous, the petiole about 3 cm. long; leaflets 5, ovate or ovate-oblong, 4 to 6 cm. long, 1.5 to 2.5 cm. wide, obtusely acuminate, rounded or obtuse at base, coriaceous, lustrous, the venation prominent and reticulate on both surfaces, the petiolules 5 to 6 mm. long; racemes fasciculate on old branchlets, 7.5 cm. long or less, lax, the rachis minutely puberulent; pedicels 1 to 2.5 mm. long; calyx 3 mm. long, minutely puberulent; standard petal about 7 mm. long.

The tree has been reported[1] from Yucatán as *Pterocarpus draco* L. The Maya name is given as "subinché."

54. ICHTHYOMETHIA P. Br. Civ. Nat. Hist. Jam. 296. 1756.

REFERENCE: Blake, Revision of *Ichthyomethia*, a genus of plants used for poisoning fish, Journ. Washington Acad. Sci. **9**: 241–252. 1919.

Trees or shrubs; leaves pinnate, the leaflets opposite; flowers in lateral panicles, appearing before the leaves, pink or white and red; fruit indehiscent, broadly 2-winged on each suture, 1 to 6-seeded.

Leaflets very densely tomentose or soft-pilose beneath.
  Leaflets tomentose beneath ..... 1. I. grandifolia.
  Leaflets short-pilose beneath ..... 2. I. mollis.
Leaflets strigose or puberulent beneath.
  Leaflets densely incurved-puberulent beneath, the hairs parallel with the veinlets; stipe of the fruit equaling or slightly exceeding the calyx. 3. I. communis.
  Leaflets strigose beneath, the hairs crossing the veinlets transversely; stipe much exceeding the calyx ..... 4. I. americana.

[1] Field Mus. Bot. 1: 368. 1898.

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1. **Ichthyomethia grandifolia** (Donn. Smith) Blake, Journ. Washington Acad. Sci. 9: 245. 1919.

Derris grandifolia Donn. Smith, Bot. Gaz. 56: 55. 1913.

Puebla and Oaxaca. Guatemala; type from Cerro Gordo.

Tree; leaflets 7 to 11, oval, 5.5 to 10 cm. long, crisped-pilosulous above, rounded at apex; calyx 7 to 8 mm. long; banner petal glabrous, 10 mm. long; fruit 4 to 9 cm. long, 3 to 5-seeded.

2. **Ichthyomethia mollis** (Rose) Blake, Journ. Washington Acad. Sci. 9: 246. 1919.

Piscidia mollis Rose, Contr. U. S. Nat. Herb. 1: 98. 1891.

Sonora and Sinaloa; type from Alamos, Sonora.

Shrub or tree, 3 to 16 meters high, the trunk sometimes 70 cm. in diameter; leaflets 7 to 13, oval, 3 to 8 cm. long, densely pilosulous on the upper surface; fruit 2.5 to 5 cm. long, 1 to 3-seeded. "Palo blanco" (Sonora, Sinaloa).

The wood is of some importance for building purposes. The flowers have not been collected.

3. **Ichthyomethia communis** Blake, Journ. Washington Acad. Sci. 9: 247. 1919.

Tamaulipas and San Luis Potosí to Yucatán. Honduras, Cuba, and Florida (type from Ramrod Key).

Tree, sometimes 25 meters high; leaflets 7 or 9, oblong or elliptic, 4 to 12 cm. long, acute or short-pointed; calyx 4.5 mm. long; banner cinereous-pubescent outside; fruit 2.5 to 7.5 mm. long, 1 to 6-seeded; wood weak, close-grained, yellowish brown, its specific gravity about 0.87. "Haabí," "habí," "haabín" (Yucatán, Maya); "chijol" (Tamaulipas, Veracruz); "flor de papagallo" (*Ramírez*); "cocuite," "javín" (Veracruz, *Villada*); "guaná hedionda" (Cuba).

This has been confused with *I. piscipula* (L.) Hitchc. (*Erythrina piscipula* L.; *Piscidia erythrina* L.; *Piscidia piscipula* Sarg.), a species confined apparently to Jamaica, where it is known as "dogwood." The properties discussed below are probably common to all or most of the species.

The wood is very durable, especially in water, and takes a fine polish. It has been used for boat building, fuel, and charcoal. Robelo states that in Mexico there is a popular belief that the wood petrifies after many years, beginning at the heart. The dry bark, especially that of the root, has a strong and disagreeable odor of opium; it produces a burning sensation in the mouth. It contains substances (one of which has been named piscidin) which are narcotic and analgesic, and has been used as an anodyne in neuralgia, nervous insomnia, whooping cough, etc. The extract of the bark is sometimes employed in tropical America for relieving toothache, applied locally, and that of the Jamaican species to cure mange in dogs. The best-known use of the tree, however, is its employment for poisoning or stupefying fish, the bark and leaves being crushed and thrown into the water. It is said that the Caribs used the juice for poisoning their arrows, but this appears doubtful.

4. **Ichthyomethia americana** (Sessé & Moc.) Blake, Journ. Washington Acad. Sci. 9: 248. 1919.

Piscidia americana Sessé & Moc. Pl. Nov. Hisp. 116. 1887.

Michoacán and Guerrero; type from Apatzingán, Michoacán. Guatemala.

Tree; leaflets 9 to 13, oval-oblong or elliptic-oblong, 4 to 8 cm. long, rounded to acute at the apex; calyx 6 to 7 mm. long; standard 15 mm. long, cinereous-puberulent outside; fruit 1.5 to 7.5 cm. long, 1 to 6-seeded. "Tatzungo," "zatzumbo" (Michoacán, Tarascan); "cocuile," "colorín de peces," "matapez" (Guerrero).

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55. LONCHOCARPUS H. B. K. Nov. Gen. & Sp. 6: 383. 1823.

REFERENCE: Pittier, Contr. U. S. Nat. Herb. 20: 37–93. *pl. 1–6. f. 1–43.* 1917.

Unarmed trees or shrubs; leaves pinnate; flowers often large and showy, racemose or paniculate; fruit compressed, thin or thick, indehiscent.

Same species are used in South America as fish poisons. The leaves of some are said to have irritant and vomitive properties.

Leaves unifoliolate ..... 1. L. unifoliolatus.
Leaves with 3 or more leaflets.
  Leaflets glabrous beneath or when young sparsely pilose along the costa.
    Pedicels mostly longer than the calyx; leaflets and calyx punctate.
      Plants wholly glabrous ..... 2. L. longistylus.
      Plants sparsely pubescent on the inflorescence and the costa of the leaflets. 3. L. longipedicellatus.
    Pedicels shorter than the calyx; leaflets and calyx not punctate.
      Fruit cochleate; leaflets 5 to 9 ..... 4. L. cochleatus.
      Fruit flat; leaflets 3 or 5, rarely 7.
        Flowers about 1 cm. long ..... 5. L. hondurensis.
        Flowers about 1.5 cm. long.
          Leaflets 6 to 9 cm. long, acutish ..... 6. L. megalanthus.
          Leaflets 9 to 11 cm. long, cuspidate-acuminate ..... 7. L. mexicanus.
  Leaflets more or less pubescent beneath over the whole surface.
    Leaflets acute or acutish at apex, or abruptly apiculate.
      Leaflets small, most of them 3 to 5 cm. long, the upper ones acute at base.
        Standard densely sericeous; keel petals auriculate. 8. L. minimiflorus.
        Standard thinly sericeous; keel petals not auriculate.
          Leaflets 9 to 15 ..... 9. L. lanceolatus.
          Leaflets 5 or 7 ..... 10. L. yucatanensis.
      Leaflets large, most of them 6 to 12 cm. long, usually rounded or very obtuse at base.
        Leaflets 5 or 7.
          Leaflets cuspidate-acuminate ..... 11. L. caudatus.
          Leaflets very short-acuminate.
            Lateral nerves of the leaves very conspicuous and prominent beneath; calyx conspicuously dentate ..... 12. L. oaxacensis.
            Lateral nerves inconspicuous; calyx subtruncate.
              Calyx densely sericeous ..... 13. L. guatemalensis.
              Calyx glabrous or nearly so ..... 14. L. purpusii.
        Leaflets 9 or more in most of the leaves.
          Lateral nerves of the leaflets 10 to 12 ..... 15. L. affinis.
          Lateral nerves of the leaflets 5 to 8.
            Standard petals 16 to 18 mm. long ..... 16. L. palmeri.
            Standard 10 to 14 mm. long.
              Leaflets finely sericeous beneath ..... 17. L. robustus.
              Leaflets scaberulous-puberulent beneath ..... 18. L. sericeus.
    Leaflets rounded or very obtuse at apex, never apiculate, often emarginate.
      Venation of the leaflets not impressed on the upper surface.
        Pubescence of the calyx brown; leaflets 1.5–3 cm. long. 19. L. comitensis.
        Pubescence of the calyx gray or whitish; leaflets mostly more than 3 cm. long.
          Leaflets oval ..... 20. L. constrictus.
          Leaflets oblong ..... 21. L. emarginatus.

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Venation of the leaflets conspicuously impressed on the upper surface.
Upper margin of the fruit conspicuously thickened—18. L. sericeus.
Upper margin of the fruit not thickened.
Ovules 7 or 8; fruit thin—22. L. rugosus.
Ovules 2 or 3; fruit coriaceous.
Fruit 7 to 11.5 cm. long—23. L. eriocarinalis.
Fruit about 4 cm. long—24. L. jaliscensis.

1. **Lonchocarpus unifoliolatus** Benth. Journ. Proc. Linn. Soc. Bot. 4: Suppl. 90. 1860.

Puebla and perhaps elsewhere in southern Mexico, the type from some uncertain locality.

Small tree; leaflets ovate, 10 to 12.5 cm. long, acuminate; flowers pink, racemose.

2. **Lonchocarpus longistylus** Pittier, Contr. U. S. Nat. Herb. 20: 62. *f. 10.* 1917.

Yucatán; type from Xbalché.

Tree with purplish flowers; leaflets 11 to 15, oblong or ovate, 3.5 to 8.5 cm. long; fruit 1 or 2-seeded, 8 to 8.5 cm. long, 3 cm. wide, with thin margins. "Bal-ché," "xbal-ché" (Maya).

3. **Lonchocarpus longipedicellatus** Pittier, Contr. U. S. Nat. Herb. 20: 61. *f. 8.* 1917.

Known only from the type locality, Jiquipilas, Chiapas.

Tree; leaflets 7 or 9, oblong or ovate, 3.5 to 10.5 cm. long, obtuse or acute; flowers purplish.

4. **Lonchocarpus cochleatus** Pittier, Contr. U. S. Nat. Herb. 20: 68. *pl. 4, C.* 1917.

Known only from the type locality, El Calabazal, Guerrero.

Tree, 4 to 5 meters high; leaflets 4 to 9.5 cm. long, obtuse or acuminate; fruit 4 to 9.5 cm. long, 2.5 to 4.5 cm. wide, with thin edges.

5. **Lonchocarpus hondurensis** Benth. Journ. Proc. Linn. Soc. Bot. 4: Suppl. 91. 1860.

Tabasco. Honduras (type locality) and British Honduras.

Tree, 6 to 8 meters high; leaflets usually 5, 3.5 to 10 cm. long; flowers purplish red. "Gusano" (Tabasco).

6. **Lonchocarpus megalanthus** Pittier, Contr. U. S. Nat. Herb. 20: 70. *f. 19.* 1917.

Sinaloa and Tepic; type from Tepic.

Tree, about 10 meters high, with low branches; leaves deciduous, the leaflets 3.5 to 9 cm. long.

7. **Lonchocarpus mexicanus** Pittier, Contr. U. S. Nat. Herb. 20: 71. *f. 20.* 1917.

Known only from the type locality, San Andrés Tuxtla, Veracruz, altitude 500 meters.

Tree with purplish flowers.

8. **Lonchocarpus minimiflorus** Donn. Smith, Bot. Gaz. 44: 110. 1907.

Chiapas. Guatemala; type from Santa Bárbara.

Tree, 8 to 10 meters high, with purple flowers; leaflets 7 to 13.

9. **Lonchocarpus lanceolatus** Benth. Journ. Proc. Linn. Soc. Bot. 4: Suppl. 92. 1860.

Sinaloa to Oaxaca.

Shrub or small tree with purple flowers; leaflets 9 to 15, 2 to 4 cm. long; fruit usually 1-seeded. "Cabo de hacha" (Sinaloa).

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10. **Lonchocarpus yucatanensis** Pittier, Contr. U. S. Nat. Herb. **20**: 74. *f. 24.* 1917.

Known only from the type locality, Progreso, Yucatán.

Leaflets 3 to 6 cm. long; flowers pink or purplish.

11. **Lonchocarpus caudatus** Pittier, Contr. U. S. Nat. Herb. **20**: 68. *pl. 4, A.* 1917.

Known only from the type locality, Acatlán, Puebla.

Tree; leaflets 6.5 to 12.5 cm. long; fruit glabrous, 1 or 2-seeded, 6 to 10 cm. long, 3 cm. wide, with thin margins.

12. **Lonchocarpus oaxacensis** Pittier, Contr. U. S. Nat. Herb. **20**: 66. *f. 14.* 1917.

Known only from the type locality, Jayacatlán, Oaxaca, altitude 1,500 meters.

Tree; leaflets 4.5 to 8.5 cm. long; flowers purplish.

13. **Lonchocarpus guatemalensis** Benth. Journ. Proc. Linn. Soc. Bot. **4**: Suppl. 87. 1860.

Veracruz and perhaps elsewhere in southern Mexico. Central America; type from Guatemala.

Deciduous tree with pinkish or purplish flowers.

14. **Lonchocarpus purpusii** T. S. Brandeg. Univ. Calif. Publ. Bot. **6**: 500. 1919.

Known only from the type locality, Zacuapan, Veracruz.

Tree, 5 to 6 meters high; leaflets 5 or 7, oval or elliptic. 5 to 6 cm. long, glabrous above, strigillose beneath; flowers dark purple; ovules 2 or 3.

15. **Lonchocarpus affinis** Pittier, Contr. U. S. Nat. Herb. **20**: 56. *pl. 1, C. f. 3.* 1917.

Veracruz; type from Orizaba.

Leaflets 13 or 15, 3 to 12.5 cm. long; flowers purplish; fruit 1 or 2-seeded, 5.5 to 9 cm. long, 1.6 to 1.8 cm. wide, the upper margin slightly thickened.

16. **Lonchocarpus palmeri** Rose, Contr. U. S. Nat. Herb. **1**: 322. 1895.

Known only from the type locality, Manzanillo, Colima.

Tree, 6 to 10 meters high, with spreading crown, the trunk 15 to 30 cm. in diameter; flowers purplish; fruit 1 to 5-seeded, 3 to 8 cm. long, 2.8 cm. wide, the upper margin thickened.

17. **Lonchocarpus robustus** Pittier, Contr. U. S. Nat. Herb. **20**: 83. *f. 34.* 1917.

Known only from the type locality, Yajalón, Chiapas.

Leaflets 9 to 13, 4 to 8 cm. long; flowers pinkish or purplish.

18. **Lonchocarpus sericeus** (Poir.) H. B. K. Nov. Gen. & Sp. **6**: 383. 1823.

Robinia sericea Poir. in Lam. Encycl. **6**: 226. 1804.

Sinaloa to Guerrero. West Indies and northern South America; reported from western Africa.

Small tree with pinkish or purplish flowers; leaflets 7 to 13, 3.5 to 9 cm. long; fruit 1 to 5-seeded, 5 to 12 cm. long, 2.3 cm. wide, the upper margin much thickened. "Cocorocho" (Guatemala).

19. **Lonchocarpus comitensis** Pittier, Contr. U. S. Nat. Herb. **20**: 76. 1917.

Known only from the vicinity of the type locality, Comitán, Chiapas.

Shrub or small tree; leaflets 7 to 11, obovate, ovate, or oblong; flowers 1.5 cm. long.

20. **Lonchocarpus constrictus** Pittier, Contr. U. S. Nat. Herb. **20**: 79. *pl. 6, A. f. 28.* 1917.

Colima and Guerrero; type from Manzanillo, Colima.

Shrub or small tree, 2 to 5 meters high; leaflets 5 to 11; flowers reddish purple; fruit 1 to 3-seeded, 5.5 to 10.5 cm. long, 6 to 7 mm. wide.

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21. **Lonchocarpus emarginatus** Pittier, Contr. U. S. Nat. Herb. **20**: 80. *f. 30.* 1917.

Oaxaca; type collected near San Gerónimo.

Leaflets 5 to 11, emarginate; flowers pink or purplish.

22. **Lonchocarpus rugosus** Benth. Journ. Proc. Linn. Soc. Bot. **4**: Suppl. 92. 1860.

Guerrero and Yucatán, type from Campeche. Central America.

Tree with deep pink flowers; leaflets 9 to 17, 2.5 to 6.5 cm. long; fruit 1 to 6-seeded, 4 to 14 cm. long, 1.7 to 2 cm. wide. "Masicarón" (Honduras).

23. **Lonchocarpus eriocarinalis** Micheli, Mém. Soc. Phys. Hist. Nat. Genève **34**: 267. 1903.

Colima and Guerrero; type from El Valle Grande, Guerrero.

Tree, 6 to 8 meters high; leaflets 7 to 11, ovate, 3 to 6.5 cm. long; flowers deep red; fruit 1 to 3-seeded. "Palo de oro" (Guerrero).

24. **Lonchocarpus jaliscensis** Pittier, Contr. U. S. Nat. Herb. **20**: 60. 1917.

Known only from the type locality, Bolaños, Jalisco.

Leaflets 7 to 13, 1.5 to 5 cm. long.

Doubtfully distinct from *L. eriocarinalis*.

See p. 1667

DOUBTFUL SPECIES.

LONCHOCARPUS OBOVATUS Benth. Journ. Proc. Linn. Soc. Bot. **4**: Suppl. 93 1860. Type from Chilá, Puebla.

LONCHOCARPUS PARVIFLORUS Benth. Journ. Proc. Linn. Soc. Bot. **4**: Suppl. 89. 1860. Type from Mexico.

LONCHOCARPUS PHASEOLIFOLIUS Benth. Journ. Proc. Linn. Soc. Bot. **4**: 93. 1860 Type from Tehuantepec.

ROBINIA ACUMINATA Schlecht. Linnaea **12**: 306. 1838. Type from Mapilque. According to Schlechtendal, this plant belongs to the genus, like the following species.

ROBINIA LATIFOLIA Mill. Gard. Dict. ed. 8. *Robinia* no. 9. 1768. Type from Campeche.

ROBINIA ROSEA Mill. Gard. Dict. ed. 8. *Robinia* no. 4. 1768. Type from Campeche.

ROBINIA SCHIEDEANA Schlecht. Linnaea **12**: 306. 1838. Type collected between Veracruz and Santa Fé.

56. MUELLERA L. f. Suppl. Pl. 52. 1781.

1. **Muellera mexicana** (Zucc.) Benth. Journ. Linn. Soc. Bot. **4**: Suppl. 117. 1860.

Cyanobotrys mexicana Zucc. Abh. Akad. Wiss. Müenchen **4**: 28. 1845.

Described from cultivated plants of Mexican origin.

Leaflets 5 to 11, ovate or oblong, acuminate, densely pellucid-punctate; pedicels 2-flowered; fruit subcompressed, subtorulose, 2.5 to 5 cm. long, 1 to 3-seeded, smooth, glabrate.

The plant is wholly doubtful, and the name may have been based upon a mixture.

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